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THE EUROPEAN IRON AND STEEL INDUSTRY: RAW MATERIALS, PRODUCTION, AND TRADE

Description

An analysis of the position of each of the European iron-and-steel-producing countries with respect to raw materials, production, and trade, based on data for pre-war years.

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ERRATUM

The reader's attention is directed to an error in Table XI on page 43. It appears from the table that the output of electric and crucible steel consisted only of castings. Actually the figure is for the combined output of castings and ingots.

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SUMMARY

The body of this report consists of fifteen chapters, each devoted to the iron and steel industry in a single European country, as of its pre-1938 borders. With the exception of the Soviet Union and the United Kingdom, any country which produces significant amounts of iron or steel at any of the several stages of production is considered. For the purposes of the report the industry is defined to cover all iron and steel producing activities from the iron mine through the steel rolling mill and associated works.

The plan of the discussion is the same for each of the countries. The position of the country with regard to the chief steel raw materials is considered first. This involves the assembly of material on domestic production, imports, and exports of iron ore, scrap iron, and coal and coke. In the case of iron ore, such related matters as grade of ore, extent of reserves, and location of ore fields are also considered. (Iron mines, coal fields, and iron and steel centers in the several countries are located on a map based for the most part on information contained in the chapters but also drawing on a map of the European iron and steel industry in C.W. Wright, The Iron and Steel Industries of Europe). The production of iron and steel is considered next.

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Where the data permit, each of the three successive stages of production -- pig iron, steel, and finished steel products (steel in the shapes and forms produced in the rolling mill and associated works) -- is discussed separately. Here the emphasis is on the location of production and on the type and quality of output. Finally, international trade in finished steel products is examined both according to product and according to area of consignment.

The discussion is based mainly on the data for selected years during the pre-war decade. An effort was made to include years marked by a high level of activity because it was felt that, in the absence of adequate data on capacity at the various stages of production, the structure of the industry in a particular country would best be revealed by its peak-level operations. Wartime changes are indicated in those cases in which they are considered important.

To provide the reader with an overall impression of the position of the steel industries of the various countries during this period, data relating to peak pre-war years have been assembled in the table on the following page. For each steel-producing country these figures show the output of steel ingots and castings (the usual measure of steel output), together with the countries' position in regard to the chief raw materials entering into steel production.

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STEEL OUTPUT AND RAW-MATERIAL POSITION OF SELECTED EUROPEAN COUNTRIES IN PRE-WAR YEARS OF PEAK ACTIVITY
(In thousands of metric tons)

	Year	Production of steel ingots and castings	Iron ore			Coal			Coke		
			Production	Imports	Exports	Production	Imports	Exports	Production	Imports	Exports
France[a]	1929	11,909	50,731	1,139	16,387	53,780	23,670	5,060	9,080	5,451	469
Germany[b]	1938	22,627	11,145[c]	21,928	5	186,179	5,005	31,178	43,521	579	5,888
Belgium[d]	1929	3,167	156	14,056	818	26,940	11,385	3,790	5,952	3,405	798
Luxemburg[d]	1929	2,127	7,571								
Czechoslovakia	1937	2,318	1,740	1,500	182	16,951	1,668	2,225	3,272	165	943
Italy	1938	2,323	997	386	---	1,480	11,915	10	1,739	218	1
Poland[e]	1937	1,452	780	651	26	36,209	87	11,003	2,126	82	308
Sweden	1937	1,106	14,952	---	13,964	460	6,606	---	122	2,331	---
Spain	1929	1,004	6,547	---	5,595	7,108	1,767	---	984	207	---
Austria[f]	1929	650	1,891	g	g	208	5,302	---	---	748	---
Hungary	1937	665	290	499	64	917	208	34	---	371	---
Rumania	1938	275	139	114	41	299	27	---	86	63	---
Yugoslavia	1938	220	607	---	374	450	234	---	---	241	---
Netherlands	1937	h	---	610	---	14,321	5,409	4,262	3,365	427	2,437

---

a The Saar was part of the French customs area in 1929, and, as a result, the foreign trade of the region was included in the French expor and import statistics, while trade between France and the Saar was considered domestic commerce. Production in the Saar in 1929 was (in thousands of metric tons): steel ingots and castings - 2,209; iron ore - negligible; coal - 13,600; coke - 2,423; and pig iron - 2,105.

b Including the Saar, which was returned to Germany in 1935. Production in this region in 1938 was (in thousands of metric tons): steel ingots and castings - 2,573; iron ore - - negligible; coal - 14,400; coke - 3,107; pig iron - 2,381 (including production in the Bavarian Palatinate).

c Peak pre-war production of iron ore was attained in 1939 when about 15 million tons were produced domestically. However, this figure included production in former Austrian and Czechoslovak regions.

d Foreign trade of Belgium and Luxemburg was reported jointly as a result of the Customs Union between the two countries.

e 1938 was a somewhat better year than 1937, but the statistical record is incomplete and may include former Czechoslovak distric

f There has been a substantial expansion in all phases of the Austrian industry during the war. These figures are of doubtful value, therefore, in appraising Austria's post-war position.

g Data not located.

h Data not available. Production is supposed to be in the neighborhood of 100,000 tons.

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THE EUROPEAN IRON AND STEEL INDUSTRY: RAW MATERIALS, PRODUCTION, AND TRADE

I. FRANCE

A. Introduction

Pre-war France had a highly developed iron and steel industry which was based on the ample supplies of iron ore found within its borders. Production of iron ore and steel was concentrated in the Lorraine Basin in which the bulk of French iron-ore reserves are located. The favorable position in which France found herself with regard to iron ore was counterbalanced by the inadequate supplies of coking coal found within the country. Other countries -- particularly Germany -- exported coal and coke to the French steel industry.

It should be noted in connection with the French statistics that until February 1935 the Saar was part of the French customs area. Before February 1935, trade between the Saar and France is, so far as the trade statistics go, an internal transaction, while after that date such trade shows up in the foreign trade statistics. As a result, in Table II, for example, Saar consumption of Lorraine iron ore in 1929 is included in "available for consumption", while in the other years included in the table it shows up under "exports". Similarly the trade of the Saar with other

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countries (excluding France) appears as a part of French foreign trade before February 1935 and disappears from foreign trade totals thereafter. This affects, for example, the volume of exports of iron and steel products from France, since the Saar exported considerable amounts of such products. So far as such a procedure was possible the Saar has been excluded from 1929 (French) data, but when this could not be done it has been indicated by footnotes to tables that the Saar has been included. In addition, whenever feasible it has been indicated in the text how the inclusion or exclusion of the Saar affected comparability between years. The reader should, nonetheless, be aware of this statistical pitfall.

B. Iron Ore

French iron-ore production data for 1929 and 1935-38 are presented in Table I. In 1929, a peak year, production was around 51 million metric tons while in 1935-38 production was in the neighborhood of 35 million metric tons annually. The geographic breakdown shows clearly the dominant role of Lorraine in ore output; in these years more than 90 percent of total output was from this district.

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Table I

FRANCE:[a] IRON-ORE PRODUCTION
(thousands of metric tons)

	1929	1935	1936	1937	1938
Lorraine	47,998	30,391	31,390	35,409	31,030
Metz-Thionville	21,355	13,657	14,125	15,629	13,773
Briey-Longwy	25,148	16,064	16,493	18,788	16,365
Nancy	1,495	670	772	992	892
Normandy	1,885	1,468	1,522	1,943	1,589
Pyrenees	234	23	42	48	109
Anjou-Bretagne	534	230	253	387	386
Other	80	2	1	52	25
TOTAL FRANCE	50,731	32,114	33,208	37,839	33,139

a The Saar is included with France through 17 February 1935. Its iron ore output is negligible.

SOURCE: The Mineral Industry during 1940, New York 1941, Vol. 49, p. 333.

Almost one half of the output of the district is from the Metz-Thionville area which was German territory before the first World War.

The Lorraine region contains France's most extensive iron-ore reserves and is, in fact, the most extensive iron-ore district in the European continent. The ores have a rather low iron content: Metz-Thionville ores are from 28 to 34 percent iron, Briey ores are from 32 to 39 percent iron, while Longwy and Nancy ores run

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from about 33 to 38 percent iron content. This is, however, compensated by several favorable features of Lorraine resources. Mining conditions are easy, which means that the ore can be won at a much lower cost than higher grade ores elsewhere. In addition, the two first-named basins produce calcareous ores and the two last-named basins produce siliceous ores. Together the mixture is ideal for the blast furnace since it is self-fluxing. Finally the phosphorous content is high and fairly constant (1.5 - 2.0 percent) which makes the ores well suited for the basic method of steel making and results in a valuable by-product, the "Thomas fertilizer" sold to agricultural users.[1]

The other iron-ore-producing districts are in Normandy where the ore contains about 45 percent iron and less phosphorous than in Lorraine; in Brittany-Anjou where the ores have about 48-52 percent iron and a high silica content; and in the Pyrenees where the richest French ores are found -- with 51-57 percent iron content. All of these districts are located on the accompanying map. Total French iron-ore reserves have been estimated at between 8 and 11 billion tons.[1]

---

[1] The Iron and Steel Industry of Germany, France, Belgium, Luxembourg, and the Saar by Frederic Benham, London and Cambridge Economic Service, Special Memorandum No. 39, p. 30.

[redacted]

In the immediate pre-war years, the French iron and steel industry consumed a quantity of iron ore equal to about 50 percent of French production. In 1929, when output was considerably above the immediate pre-war level, the domestic consumption accounted for about 70 percent of total output, but this reflects the fact that iron ore shipped to the Saar was not figured as an export in that year owing to the fact that the Saar was part of the French customs area. The remainder of domestic production (about 50 percent normally) is exported and, at the same time, small amounts of foreign ore are imported. Foreign trade and domestic consumption for the years 1929 and 1935-39 are shown in Table II.

Iron-ore exports from France are shown by country of destination in Table III. Belgium-Luxemburg and Germany together took almost all of French exports during this period. The data show also that there was some tendency in recent years for the German share of the total to grow larger at the expense of the Belgium-Luxemburg portion. This

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[1] C.W. Wright, The Iron and Steel Industries of Europe. US Bureau of Mines, 1939, p.3.

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Table II

FRANCE:[a] PRODUCTION, FOREIGN TRADE AND CONSUMPTION OF IRON ORE
('000 m.t.)

	1929	1935	1936	1937	1938	1939[b]
Production	50,731	32,114	33,208	37,839	33,139	35,000
Exports	16,387	16,631	18,251	19,320	15,513	18,000
Imports	1,139	444	391	921	437	600
Available for consumption	35,483	15,927	15,348	19,440	18,063	17,600

---

a Includes the Saar through 17 February 1935.
b 1939 data are available only for a 7-month period. The full year has been estimated by extrapolating the 7-month figure.

SOURCE: Tables I, III and IV.

Table III

FRANCE:[a] IRON-ORE EXPORTS BY COUNTRY OF DESTINATION
('000 m.t.)

	1929	1935	1936	1937	1938[b]	1939[c]
Belgium-Luxemburg	12,407	10,384	10,110	11,599	9,145	5,993
Germany	2,667	5,861	7,793	7,132	5,864	2,760
United Kingdom	183	91	236	405	338	200
Netherlands	1,127	196	82	111	95	47
Other Countries	4	99	30	73	71	18
TOTAL	16,389	16,631	18,251	19,320	15,513	9,018

---

a Includes the Saar through 17 February 1935.
b The Mineral Industry, 1940, p. 334.
c Data include 7 months only. From the files of the Foreign Minerals Division of the US Bureau of Mines.

SOURCE: 1929-37, US Tariff Commission, Iron and Steel, Washington, 1938, p. 220.

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reflects the growth of German steel production at the same time as the output of the Belgium-Luxembourg steel industry was shrinking. Although the relative importance of the two markets shifted, they are both close to French producing districts, a fact which emphasizes the reliance of French low-grade ores for their market on nearby consumption centers. Imports, which are of small relative importance, originate in widely scattered regions, as Table IV shows.

Table IV

FRANCE:[a] IRON ORE IMPORTS BY COUNTRY OF ORIGIN
('000 m.t.)

	1929	1935	1936	1937	1938[b]	1939[b]
Belgium-Luxembourg	577	226	140	463	106	17
Spanish Morocco	17	100	73	10	8[c]	4
Sweden	13	47	56	160[d]	103	37
Tunisia	131	2	44	127	82	13
Spain	302	36	43	9	..	..
Algeria	27	18	14	117	106	266
Germany	e	2	e	f	..	..
Switzerland	31	1	1	f	4	e
Norway	18	3	e	d	..	..
All others	23	9	20	35	224	48
TOTAL	1,139	444	391	921	437	355

SOURCE: 1929-37, US Tariff Commission, op. cit., p. 220.

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a. Including the Saar through 17 February 1935.
b. From the files of the Foreign Mineral Division of the US Bureau of Mines. 1939 data include 7 months only.
c French Morrocco.
d Norway included with Sweden.
e Less than 500 tons.
f Not separately reported.

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C. Scrap Iron

The marked prevalence of Bessemer steel production in France (see Table X) has meant a relatively small consumption of scrap iron in steel production. Since much scrap is generated by French metal producing and consuming industries, France has had an export surplus. Net exports of scrap by France, and consumption of scrap by the French iron and steel industry are summarized in Table V.

Table V

FRANCE: SCRAP CONSUMPTION AND NET EXPORTS, 1929-1938
('000 m.t.)

	1929	1935	1936	1937	1938
Consumption					
Blast furnaces	...	444	508	1,015	...
Steel plants	...	2,133	2,201	2,467	...
Iron foundries, etc.	...	100	100	100	...
TOTAL	...	2,677	2,809	3,582	...
Net exports	417	649	637	183	490

SOURCE: Study by Paul Hermberg of the Federal Reserve Board.

D. Coal and Coke

Production and trade of bituminous coal and metallurgical coke are shown in Table VI. Although

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France is a large coal producer, she did not satisfy her domestic requirements and on the average had to import about 1/3 of the quantity consumed. Her reliance on foreign sources for metallurgical coke was even heavier and in the period 1929-38 imports accounted for about 40 percent of domestic consumption. The coke data in Table VI do not tell the entire story in this respect, for much of the metallurgical coke produced in France was from imported coal.[1] Coal was imported mainly from the United Kingdom, Germany, Belgium-Luxemburg, Poland and the Netherlands. Coke was received mainly from the German Ruhr district.

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[1] For example: the consumption of metallurgical coke in 1930 was about 11 million tons. In terms of coal this amounted to about 15½ million tons. The origin of this coal was:

	'000 tons
France	5,839
Germany	4,904
Holland	1,484
Great Britain	1,079
Belgium	993
Saar	1,271
TOTAL	15,570

Source: Benham, *op. cit.*, p. 31.

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Table VI

FRANCE:[a] COAL AND COKE PRODUCTION, FOREIGN TRADE, AND CONSUMPTION

('000 m.t.)

Year	Production	Imports	Exports	Available for consumption
		Bituminous coal		
1929	53,780	23,670	5,060	72,390
1935	46,213	17,892	1,216	62,889
1936	45,227	18,655	882	63,000
1937	44,318	24,620	676	68,262
1938	46,498	18,704	886	64,316
1939	51,000	9,127[c]	641[c]	......
		Metallurgical Coke		
1929	9,080	5,451	469	14,062
1935	7,083	2,118	293	8,908
1936	7,101	2,561	266	9,396
1937	7,802	3,860	232	11,430
1938	7,785[b]	2,362	212	6,432
1939	n.a.	1,751[c]	138[c]	.....

SOURCE: Reichskohlenrat and Reichskohlverband, Statistische Übersicht über die Kohlenwirtschaft im Jahre 1937-1938 p. 65 ff.

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[a] Includes the Saar through 17 February 1935. Saar production in 1929 (in '000 tons) was: bituminous coal, 13,600; metallurgical coke, 2,423.

[b] US Bureau of Mines, Minerals Yearbook Review of 1942, Washington, 1943, pp. 910, 990.

[c] 7 months total, from Statistique Mensuelle du Commerce Exterieur, Paris, July 1939, pp. 104, 276.

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E. Pig Iron

French pig-iron production is shown by districts in Table VII. Peak production in 1929 was about 10 million tons, but more recent years saw a substantially lower level of production. Normally from 75 to 80 percent of total production was from Lorraine (East and Alsace-Lorraine in the table) where the blast furnaces produce primarily from local ores. Most of the remainder was produced in the North. High-phosphorus pig iron (containing one or more percent phosphorus and suitable for the production of Thomas slag) accounted for about 90 percent of total French output. Metallic materials consumed in the production of pig iron are shown in Table VIII.

Production, exports, imports, and apparent consumption of pig iron in France are shown in Table IX. Consumption did not differ significantly from domestic production since relatively little pig iron crossed France's borders. The small imports were largely of low-phosphorus pig iron and came mainly from neighboring suppliers. Exports were considerably larger than imports and also went largely to neighboring countries in short cross-border hauls.

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Table VII

FRANCE: PRODUCTION OF PIG IRON AND FERRO-ALLOYS BY DISTRICT
('000 m.t.)

	1929	1935	1936	1937	1938[a]	1939
East[b]	4,313	2,495	2,569	3,390	2,475	....
Alsace-Lorraine	3,806	2,100	2,317.5	2,851	2,235	....
North	1,215	653	841	1,044	784	....
Center	189	375	52	65	81	....
South-West	174.5	61	52	73	71	....
South-East	139	83	91	115	108	....
West	528	321.5	306.5	374	307	....
Saar	2,105[c]	...	...	...	.....	.....
TOTAL	12,469	5,789	6,230	7,914[a]	6,061	7,826[d]

SOURCE: 1929-37, British Iron and Steel Federation, Statistics of the Iron and Steel Industries (for the year 1937) 1938, p. 73.

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a Bulletin du Comité des Forges de France, May 1939

b Pre-1914 French Lorraine

c Saar included with Germany from 1935 on.

d The Mineral Industry, 1940, p. 333.

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Table VIII

FRANCE: MATERIALS CONSUMED IN BLAST FURNACES BY DISTRICT IN 1937
('000 m. t.)

District	Production of pig iron and ferro-alloys	Materials consumed			
		Iron ore		Manganese ore	Cinder & scale, scrap, "blue billy", etc.
		Home	Imported		
East	3,390	9,642	276	167	582
Alsace-Lorraine	2,851	8,758	267	116	493
North	1,044	1,907	195	79	346
Centre	63	21	3	2	61
South-West	78	58	66	22	196
South-East	115			35	
West	374	613	117	17	
TOTAL	7,914	20,998	924	437	1,679

SOURCE: British Iron and Steel Federation, op. cit. 1937, p. 74

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Table IX

FRANCE: PIG IRON[a] PRODUCTION, IMPORTS, EXPORTS, AND CONSUMPTION
('000 m.t.)

	1929[b]	1935[b]	1936	1937	1938
Production	12,469	5,612	6,071	7,698	6,061[c]
Exports	562	137	149	421	538[d]
Imports	41	56	66	41	31[d]
Available for consumption	11,948	5,531	5,988	7,318	5,554

SOURCE: 1929-37, Tariff Commission, *op. cit.*, p. 223

---

a. Including ferro-alloys in 1938 and 1939
b. Including the Saar through 17 February 1935
c. Table VII
d. From the files of the Foreign Minerals Division of the U.S. Bureau of Mines.

F. Steel

Steel production in France is shown in Table X. Peak production in 1929 was about 10 million tons, although output in more recent years was considerably below this level. Table IX, which shows the regional breakdown of output, indicates that Lorraine was predominant in steel as well as in iorn ore and pig iron. About 2/3 of raw steel production was from Lorraine. Other regions, particularly

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the North, were somewhat more important in steel than in the earlier stages of production. This is accounted for by the availability to Northern producers of large supplies of scrap from neighboring industrial areas and by some receipt of pig iron from Lorraine.

Table X

FRANCE: STEEL PRODUCTION BY DISTRICTS 1929-1939
('000 m.t.)

	1929	1935	1936	1937	1938	1939
Saar	2,209[a]	--	--	--	--	--
East	3,674	2,311	2,388	2,925	2,142	n.a.
Alsace-Lorraine	2,985	1,972	2,208	2,618	2,012	n.a.
North	1,698	1,140	1,249	1,425	1,151	n.a.
Central	567	357	367	398	363	n.a.
Southwest	56	34	35	46	44	n.a.
Southeast	125	79	68	78	77	n.a.
West	595	384	393	429	385	n.a.
TOTAL	11,909	6,277	6,708	7,919	6,174	8,539[b]

SOURCE: 1929-1938, Wright, op. cit., pp. 9, 42

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[a] The Saar included with Germany from 1935 on.
[b] The Mineral Industry, 1940, p. 334.

Production of steel ingots and castings by both process and district is summarized for one year

[redacted]

in Table XI. Basic Bessemer is the most important variety of steel produced in France, accounting for about two-thirds of total steel output. The remainder is accounted for almost entirely by basic open-hearth steel, with the other processes accounting for relatively small amounts. The Lorraine district is the most important producer by both of the chief processes, although other districts are of greater relative importance in the production of basic open-hearth steel than in the production of basic Bessemer steel. This is explained in large measure by the fact that scrap can be substituted for pig iron in the open-hearth process and hence local resources of ore and pig iron -- Lorraine's chief advantage -- are not a limiting factor. This is revealed in Table XII which shows metallic material consumed in the production of steel in 1937.

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Table XI

FRANCE: PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESS AND DISTRICT, 1937
('000 m.t.)

Process	East	Alsace-Lorraine	North	Other Districts	Total Ingots	Total Castings	Total
Bessemer acid	14	...	26	8	...	48	48
Bessemer basic (Thomas)	2,286	2,022		941	5,250	1	5,250
Open-hearth acid	...	...		21	21	Nil	21
Open-hearth basic	1,109		675	486	2,206	64	2,270
Crucible			15		14	1	15
Electric	...	...	...	316	276	40	316
Total ingots	2,902	2,602	1,348	915	7,767	...	...
Total castings	24	16	77	37	...	154	...
TOTAL	2,925	2,618	1,425	951	7,767	154	7,920

SOURCE: British Iron and Steel Federation, op. cit., 1937, p. 76.

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Table XII

FRANCE: MATERIALS CONSUMED IN THE PRODUCTION OF STEEL INGOTS AND CASTINGS IN 1937

('000 m.t.)

Materials	Bessemer basic	Bessemer acid	Open hearth	Crucible	Electric	Total
Pig iron Ferro-alloys	6,062	17	522	2	15	6,447 171
Scrap	176	52	1,914	7	217	2,366
Iron Ore	...	..	21	..	5	26
Manganese	...	..	1	..	a	1

SOURCE: British Iron and Steel Federation, op. cit., 1937, p. 76.

---

a. Less than 500 tons.

Tables XIII through XVIII show the production and foreign trade of finished and semi-finished steel products. Tables XIII - XV show production and trade according to the particular shapes produced. The detailed figures in these tables are summarized in Table XVI.

From Table XVI it is clear that, taking French steel production as a whole, the foreign market was of great importance. In 1929, when the Saar was included in the French customs area, exports of finished products equalled almost 40 percent

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Table XIII

FRANCE: PRODUCTION OF FINISHED STEEL AND SEMI-FINISHED STEEL FOR SALE

('000 m.t.)

	1929	1935	1936	1937	1938[b]	1939[b] [c]
Semi-finished for sale	1,757	987	1,285	1,445	1,080	756
Girders and sections	886	448	476	458	346	248
Rails	610	317	280	368	303	106
Plates and sheets	1,185	867	962	1,046	880	560
Universal plates	73	45	32	37	33	21
Special steel in bars	207	153	142	151	1,426	908
Other merchant bars	2,279	1,265	1,470	1,760		
Hoops and strips	258	212	221	284	170	140
Tires	79	46	37	45	50	19
Axles	20	9	6	..	..	..
Sleepers	142	85	56	71	84	18
Fishplates	45	34	34	50	31	9
Wire rods	435	315	355	404	293	240
Wire	190	141	175	180	177	116
Tubes and pipes	260	250	273	286	261	197
Forgings	55	46	41	55	58	38
Tin plates	85	107	123	123	131	73
Total finished steel	6,809	4,340	4,683	5,318	4,066	3,449

PRODUCTION IN THE SAAR IN 1929[a]

Permanent way material	230
Girders, beams, etc.	252
Steel bars, sections, etc.	498
Hoops and strips	120
Wire rods	158
Plates, over 5 mm.	161
Plates, 3-5 mm.; sheets under 3 mm.; and tinplates	96
Tubes	83
Forgings	4
Other finished steel	1
TOTAL	1,602

SOURCE: 1929-37, Tariff Commission, 229

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[a] Beginning March 1935 production was included with that of Germany.

[b] *Bulletin du Comité des Forges de France Statisique* 1938, p. 6. March 1939, p. 10

[c] 6 months only.

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Table XIV

FRANCE:[a] IMPORTS OF SEMI-FINISHED AND FINISHED IRON AND STEEL
('000 m.t.)

Product	1929	1935	1936	1937	1938[b]	1939[b,c]
Semi-finished:						
Ingots	.1	.5	d	1.6	d	d
Blooms and billets	.8	3.1	3.1	14.1	.9	.4
Total semi-finished	.9	3.6	3.1	15.7	.9	.4
Finished:						
Bar	45.6	25.1	28.5	13.2	8.2	6.6
Tool and special steel	9.3	2.8	2.8	4.2	5.1	5.5
Wire rods	1.1	12.1	7.6	7.1	...	...
Hoops and ships	6.2	5	4.6	5.7	2.8	1.6
Plates and sheets	24.4	20.4	19.5	23.6	11	11.5
Universal plates	.7	.1	.1	.5	.4	d
Tinned and other coated plates	.3	3.4	3.6	15.1	.4	.3
Wire	4.6	3.1	3.1	3.2	2.3	1.5
Rails	6.2	1	.5	.6	.2	.2
Railway chairs	6.2	2.4	1.6	2.0		.1
Other railway and tramway material	1	.4	.1	.4	.6	.1
Railway and other axles	.4	.1	d	d	.6	.1
Anchors, cables, and chains	5	1	1.3	1.6	...	...
Nails and screws	3	1.4	1.6	1.5	...	...
Tubes and pipes	19.3	8.2	7.5	7	7	4
Structural iron and steel	36	6.3	4.5	6.6	...	...
Other products	5.3	2.7	2.2	3	...	...
Total finished	201.8	95.5	89.2	95.2		
Total semi-finished and finished	202.7	99.1	92.4	110.9		

SOURCE: Tariff Commission, *op. cit.*, p. 230

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[a] Including the Saar through 17 February 1933.

[b] *Statistique Mensuelle du Commerce Exterieur de la France*, 1938, pp. 111-113, 1939, p. 109. Incomplete tabulation: some categories missing.

[c] First 7 months.

[d] Less than 50 tons.

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of production. In more recent years the percentage fell off, and in the years 1935-37 exports averaged around 30 percent of domestic production. In semi-finished steel, too, the export market was of considerable importance. In 1935 and 1936 exports were about 25 percent of domestic production. However, as the war drew closer this percentage declined considerably. Imports were of little importance to the French industry.

In Tables XVII and XVIII French exports and imports are shown according to countries of origin and destination. The relatively small imports originated mainly in the nearby producing countries of Germany and Belgium-Luxemburg. Before the return of the Saar to Germany, French export statistics show Germany as the largest customer, but in 1936, after the Saar was returned to Germany, exports to Germany fell away to practically nothing. Other large customers of France were Belgium-Luxemburg, the United Kingdom, Algeria, and Switzerland, all very close to France. In addition to these countries, a large number of small customers also received exports, no one of which took more than about 5 percent of the total.

During the 1930's exports declined considerably from their 1929 peak. Outside of the decline because of the transfer of the Saar, the most important reason for declining exports was the great decrease in the amounts taken by the United Kingdom and Belgium-Luxemburg.

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Table XV

FRANCE:[a] EXPORTS OF SEMI-FINISHED AND FINISHED IRON AND STEEL

('000 m.t.)

Product	1929	1935	1936	1937	1938[b]	1939[b] [c]
Semi-finished:						
Ingots	41	1	1	19	8.3	1.3
Blooms and billets	452	240	289	259	174	120
Total semi-finished	493	241	290	278	182.3	121.3
Finished:						
Bars	1,625	697	581	703	509	418
Tool and special steel	4	2	2	6	5.2	3
Wire rods	208	129	110	132	62	48
Hoops and strips	96	61	35	50	36	26
Plates and sheets	160	108	52	111	142	67
Universal plates	12	11	3	10	5.2	5
Tinned and other coated plates	31	44	22	19	52	42
Wire	49	31	22	27	48	50
Rails	326	117	74	117	97	47
Railway chairs, etc.	272[d]	64[d]	79[d]	74[d]		
Other railway and tramway material	12	3	4	8	14	8
Railway and other axles	12	7	2	1	1.5	1
Anchors, cables, and chains	16	3	3	3		
Nails and screws	61	20	16	23		
Tubes and pipes	71	63	64	59	60	38
Structural iron and steel	232	80	51	60	e	
Other products	25	9	10	12		
Total finished	3,212	1,449	1,130	1,415		
Total semi-finished and finished	3,705	1,690	1,420	1,693		

SOURCE: Tariff Commission, *op. cit.*, p. 231.

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[a] Including the Saar through 17 February 1935.

[b] *Statistique Mensuelle du Commerce Exterieur de la France*, 1938 and 1939. Incomplete tabulation: some categories missing.

[c] First 7 months.

[d] Including cast-iron pipe which probably constitutes the major portion of the exports.

[e] Included in bars.

Table XVI

FRANCE: PRODUCTION, FOREIGN TRADE AND APPARENT CONSUMPTION OF FINISHED AND SEMI-FINISHED IRON AND STEEL
('000 m.t.)

	1929	1935	1936	1937	1938
Finished					
Production	8,421	4,340	4,683	5,318	4,066
Imports	201	95	89	95	.....
Exports	3,212	1,449	1,130	1,415	.....
Apparent consumption	5,409	2,986	3,642	3,998	.....
Semi-finished					
Production	1,757	987	1,285	1,445	1,080
Imports	1	4	3	16	1
Exports	493	241	290	278	182
Apparent consumption	1,263	742	1,192	1,161	897

SOURCE: Tables XIII-XV.

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Table XVII

FRANCE: IMPORTS OF IRON AND STEEL BY PRODUCT AND COUNTRY OF ORIGIN, 1936
('000 m.t.)

	Sweden	Germany	Netherlands	Belgium & Luxemburg	Switzerland	United States	United Kingdom	Total, incl. other countries
Semi-finished								
Ingots	...	...	...	...	...	...	...	1
Blooms and billets	176	317	...	2,648	6	...	...	3,147
TOTAL	176	317	...	2,648	6	...	...	3,148
Finished								
Bars	1,177	4,923	65	20,602	129	...	1,519	28,535
Tool and special steel	1,343	420	...	1	4	55	283	2,832
Wire rods	107	...	...	7,408	...	...	100	7,616
Hoop and strip	1,268	1,316	...	735	702	55	476	4,554
Plates and sheets	119	1,138	7	16,070	97	1,140	687	19,498
Universal plates	14	...	...	...	...	...	98	112
Tinned and other coated plates	...	39	...	203	15	419	2,876	3,571
Wire	187	1,105	...	54	1,119	227	359	3,082
Rails	...	428	...	98	...	...	1	528
Railway chairs, etc.	...	917	18	1,940	27	...	71	3,398
Other railway and tramway material	...	71	...	63	...	2	4	140
Railway and other axles	...	3	...	1	...	...	1	5
Anchors, cables and chains	...	297	5	87	...	401	418	1,286
Nails and screws	1	764	2	301	10	193	262	1,551
Tubes and pipes	2,341	1,953	290	359	1,455	496	351	7,546
Structural iron and steel	...	2,015	24	1,002	1	2	30	3,268
Other items	22	1,841	47	203	18	61	83	2,679
TOTAL	6,755	17,552	458	51,775	3,583	3,032	7,619	93,346

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SOURCE: British Iron and Steel Federation, op. cit., 1937, p. 82.

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Table XVIII

FRANCE:[a] EXPORTS OF FINISHED AND SEMI-FINISHED PRODUCTS BY COUNTRY OF DESTINATION

('000 m.t.)

	1927	1931	1932[a]	1934[a]	1936
Soviet Union	...	14	17	54	26
Sweden	53	56	32	58	77
Norway	23	26	29	38	48
Denmark	41	67	64	54	24
Germany	1,310	863	654	987	1
Netherlands	87	91	107	91	43
Belgium-Luxemburg	1,045	298	144	177	73
Austria	...	...	2	b	2
Switzerland	244	279	277	235	128
Portugal	9	11	15	13	25
Spain	21	20	2	3	...
Italy	200	140	68	94	18
Rumania	3	3	12	29	15
Greece	8	17	2	43	17
Turkey	3	26	8	30	6
Dutch East Indies	...	...	[illegible]	...	11
Egypt	38	33	53	27	17
China	11	...	51	47	40
Japan	93	16	57	56	21
United States	90	52	18	13	41
Brazil	53	1	7	6	18
Argentina	90	44	43	54	49
United Kingdom	1,048	632	225	237	273
South Africa	8	...	13	15	16
British India	75	...	24	25	31
Canada	1	7	1	b	...
Other British Colonies	...	...	15	28	9
French Indo China	66	27	36	58	36
Algeria	94	43	204	176	117
Tunis	21	5	6	24	39
Morocco	44	11	62	27	26
Other French Africa	27	17	24	15	24
Other French Colonies	15	13	66	62	37
Unallocated	222	166	150	148	121
TOTAL	4,810	2,678	2,518	2,901	1,429

SOURCE: British Iron and Steel Federation, op. cit., pp. 76-79, 1936; 1933-34, p. 64-65, 1930.

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a Including the Saar through 17 February 1935.
b Less than 500 tons.

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II. GERMANY

A. Introduction

The pre-war German steel industry was second only to that of the US. Germany's natural advantage in steel production was due to the location of the extensive Rhineland-Westphalia coal field within her borders. Although abundantly endowed with coal, Germany had to depend on foreign sources for much of her iron ore. Sweden and the Lorraine field of France (which was, in part, German before World War I) ordinarily provided the bulk of the imported ore. Both Lorraine and Swedish ore are easily brought to German steel-producing regions

It should be noted in connection with the German statistics that there were numerous occasions during the pre-war period when comparability could be upset by territorial acquisitions. The first, and, probably the most important from this standpoint, was the return of the Saar to Germany in February 1935. In the introductory paragraphs in the section on France the effects on French statistics are indicated: in the case of Germany the effects are the reverse of those noted for France. For example, German imports of ore are larger by the amount of Saar imports beginning with March 1935, while German imports of iron and steel products are decreased by the amount formerly imported

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from the Saar. The acquisition of Austria and the Sudentenland in 1938 does not seem to have affected the comparability of 1938 statistics since their production was usually shown separately. Exceptions to this are indicated in footnotes to the tables. In all cases, too, the inclusion of the Saar is noted along with a consideration of the effects on comparability between years. The reader should, however, be aware of these statistical difficulties.

B. Iron Ore

Germany's iron-ore production increased steadily during the years immediately preceding the war. Figures for selected years are shown in Table I, which also indicates the production in the several producing districts. In examining the data in this table it is important to note that not all of the increase in production shown is due to the expansion of production in regions within the borders of the Altreich. Thus about 2/3 of the more than 6 million tons produced in "other regions" in 1939 is probably production in former Austria and to a lesser extent in Czechoslovakia. Attention here is therefore directed to production in those regions which are clearly indicated as part of the Altreich, since the others are covered under their original nationality.

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TABLE I

GERMANY: IRON ORE PRODUCTION[a]
('000 metric tons)

	1929	1935	1936	1937	1938[b]	1939[b][c]
Peine-Salzgitter	....	1,827	2,286	2,765	3,250	3,482
Siegerland	....	2,774	1,849	1,950	1,641	1,626
Bavaria[d]	....	612	871	1,034	2,348[d]	3,982[d]
Lahn-Dill	....	575	710	857	882	6,034
Vogelsberg	....	610	686	783	1,920[e]	
Other regions	....	646	1,166	2,403		
	6,374	6,044	7,570	9,792	10,041	15,104

SOURCES: 1929, Statistisches Jahrbuch für das Deutsche Reich, Berlin, 1935, p. 128

1935-37, Bulletin du Comite des Forges de France, March, 1939

1938-39, US Bureau of Mines, Mineral Trade Notes, Vol. IX, No. 3, p. 5

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[a] The data for 1939 and possibly 1938 include production of new territories acquired by Germany in these years. It is not possible to determine the exace influence of such territorial changes because of the manner in which the data are presented.

[b] The data for 1938 and 1939 are incomparable with earlier years because of a change in the method of showing the statistics. In 1937 and earlier years the quantities, as shown, are wet weights, while 1938 and 1939 are the dry-weight equivalents. The wet weight for 1938 is 11,145,000 tons, as compared with the 10,041,000 tons shown in the table: a difference of about 10%.

[c] Figures at an annual rate, estimated.

[d] The 1938 and 1939 figures for Bavaria, include, in addition, Württemberg and Baden.

[e] Include production of 563,000 tons for Silesia.

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The pattern of iron-ore production within the Altreich showed a significant shift during the period under consideration. In 1935 Peine-Salzgitter and Siegerland were of about equal importance and together accounted for close to 60 percent of total production. In 1939 Siegerland was at substantially the same production level as in 1935, while Peine-Salzgitter (considering the shift from wet to dry weight) produced at twice the 1935 level and had become the most important single producing district within the Altreich. At the same time production increased substantially in other producing regions, particularly Bavaria and Baden. It is, indeed, possible that by 1939 each of these two districts outproduced Siegerland.

By 1939 Peine-Salzgitter, Siegerland, Bavaria, and Baden probably produced about 80 percent of the iron ore mined within the Altreich. Outside of these districts there was a scattered production of about 2 million tons with Lahn-Dill the most important single remaining district. Total production was about 11 million tons (dry weight) or about 12 million tons in the more familiar wet-weight measure. These 12 million tons averaged about 32 percent in iron content.

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Peine-Salzgitter, the chief region, produced ore averaging about 30 percent iron and containing a high percentage of phosphorous.

Reserves of iron ore within the Altreich are conservatively estimated at about 1 billion tons of fairly low-grade material. The reserves are scattered, with the largest concentration in the Peine-Salzgitter region.

Table II

GERMANY:[a] PRODUCTION, FOREIGN TRADE, AND APPARENT CONSUMPTION OF IRON ORE, 1929 - 1938
('000 m.t.)

	1929	1935	1936	1937	1938
Production	6,374	6,044	7,570	9,792	11,145
Imports	21,867	14,627	18,469	20,621	21,928
Exports	116	18	6	10	5
Available for Consumption	28,125	20,653	26,033	30,403	33,068[a]

SOURCES: Tables I and III. Exports (1939-37) from British Iron and Steel Federation; op. cit., 1938 from Bureau of Mines, Foreign Minerals Division Files.

In Table II Germany's production, foreign trade, and apparent consumption of iron ore are

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a Includes the Saar, beginning March 1935.

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summarized. The heavy dependence of the German steel industry on imported ores is clearly demonstrated by these figures. Even after the Germans had made a determined effort to develop their own iron resources, domestic production satisfied only about one-third of the country's requirements, as the 1937 and 1938 data indicate. There were, in addition, some exports but these were very small. Total amounts of iron ore available for German consumption increased steadily during the pre-war period and by 1938 were 33 million metric tons.

Germany's reliance upon foreign sources of iron ore was even greater than the figures in Table II indicate, since much of the imported ore was of a higher grade than domestic output. Table III indicates that in recent years Sweden has been the leading source of German imports, accounting for between 40 and 50 percent of all imports in 1937 and 1938. Swedish ores, in particular, are of an extremely high grade, running between 50 and 60 percent contained iron. French ores, too, are of a somewhat higher grade than those produced in Germany, while Spanish and Norwegian ores, as shipped,[1] contain between 50 and 60 percent iron.

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[1] These ores are concentrated prior to shipment.

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Table III

GERMANY: IRON ORE IMPORTS
('000 metric tons)

From	1929	1935	1936	1937	1938	1939[a]
France	8,167	6,180	6,860	5,740	5,056	2,362
Sweden	7,382	5,509	8,248	9,084	8,992	5,777
Spain	3,025	1,321	1,068	310	1,083	571
Norway	688	515	527	510	1,118	732
Other	2,605	1,102	1,766	4,977	5,679	3,832
TOTAL	21,867	14,627	18,469	20,621	21,928	13,274

SOURCES: 1929-38 - Wright op. cit., p. 12.
1939 Bureau of Mines, Foreign Minerals Division Files.

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[a] 7 months total.

C. Scrap Iron

Germany consumed much scrap iron in the production of steel in pre-war years. Most of the scrap consumed by the German industry was of domestic origin, either produced as a by-product of metal-working operations or collected from the scrap pile. In addition, Germany was a net importer of scrap on a constantly increasing basis before the war. By 1938 net imports were over 1 million m.t., more than

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5 times what they had been in 1935. The increase in the relative importance of North America as a source of supply as imports increased is striking. German scrap consumption and net imports are summarized in Tables IV and V.

Table IV

GERMANY: SCRAP CONSUMPTION
('000 m. t.)

	1935	1936	1937
Blast furnaces	748	926	843
Steel plants	6,106	7,186	7,249
Iron foundries	1,304	1,629	1,731
TOTAL	8,158	9,738	9,823

SOURCE: Hermberg, *op. cit.*

[redacted]

Table V

GERMANY: NET SCRAP IMPORTS
('000 m.t.)

FROM	1929	1935	1936	1937	1938	1939
Continental Europe	...	151	223	326	511	316
Africa	...	...	...	5	...	...
United Kingdom	...	34	43	56	118	47
North America	...	13	4	162	464	119
Latin America	...	3	3	6	35	27
Oceania	...	1	1	...	...	...
Other	...	...	...	...	...	6
TOTAL	358	202	274	555	1,128	515

SOURCES: 1929-38 - Hermberg, op. cit., Appendix 3, Table 3
1939 - Bureau of Mines, Foreign Minerals Division Files.

D. Coal and Coke

In contrast with her iron-ore position, Germany produced substantially greater amounts of bituminous coal and metallurgical coke than were required for domestic consumption. Table VI, which summarizes the relevant figures on Germany's coal and coke production and trade, shows Germany's large export surplus in all pre-war years. It should be

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noted that, starting with 1935, the output and foreign trade of the Saar district have been included with Germany as indicated in the footnote to Table VI.

Table VI

GERMANY,[a] BITUMINOUS COAL AND COKE: PRODUCTION, IMPORTS, EXPORTS, AND APPARENT CONSUMPTION
('000 m.t.)

	1929	1935	1936	1937	1938
Bituminous Coal					
Production	163,437	143,003	158,283	184,513	186,179
Imports	7,903	4,270	4,289	4,583	5,005
Exports	26,769	26,774	28,650	38,629	31,178
Apparent consumption	144,571	120,499	133,922	150,467	160,006
Coke					
Production	39,421	29,801	35,833	40,921	43,511
Imports	433	751	663	550	579
Exports	10,653	6,611	7,184	8,793	5,888
Apparent consumption	29,106	23,941	29,312	32,678	38,202

SOURCES: 1929 - British Iron and Steel Federation, op.cit.
1935-38 - Statistische Ubersicht über die Kohlenwirtschaft

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[a] Including the Saar district beginning with March 1935. Output in the Saar was:

Year	Bituminous Coal (mill. m. t.)	Metallurgical Coke ('000 m.t.)
1935	10.6	2,334
1936	11.7	2,736
1937	13.4	2,844
1938	14.4	3,107

SOURCE: Statistische Ubersicht Uber die Kohlenwirtschaft, 1937-8, pp. 8, 10.

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E. Pig Iron

German pig-iron production is shown according to region in Table VII. Total production increased steadily in the pre-war years and, by 1938, was more than 18 million tons. In part the 4½ million ton increase between 1929 and 1938 reflects the re-incorporation of the Saar district into Germany. The Saar could be expected to contribute somewhere around 2 million tons of pig iron, mainly of a basic variety, according to Table VIII.

The most important single producing district was Rhineland-Westphalia, which accounted for about 70 percent of the pre-war production. The Saar district was the second largest with about 13 percent of total output. The remainder was scattered through the other producing regions.

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TABLE VII

GERMANY: PIG IRON PRODUCTION
('000 metric tons)

District	1929	1935	1936	1937	1938
Rhineland-Westphalia	10,985	9,086	10,801	11,205	12,910
Siegerland and Hesse-Nassau	658	365	444	531	615
Silesia	180	1,192	1,481	1,710	1,778
Northern, Eastern, and Central Germany	1,264				
Saar District and Bavarian Palatinate	---	1,937	2,163	2,187	2,381
South Germany	314	261	315	326	362
TOTAL	13,401	12,842	15,303	15,958	18,044

SOURCE: 1929-37 - British Iron and Steel Federation, *op. cit.*, 1937, p. 90
1938 - *Wirtschaft und Statistik*, 1939

TABLE VIII

SAAR: PRODUCTION OF PIG IRON BY QUALITY, 1929 - 34
('000 m.t.)

	1929	1930	1931	1932	1933	1934
Hematite	207	223	164	90	150	164
Foundry iron & direct castings						
Basic	1,898	1,690	1,351	1,259	1,442	1,662
TOTAL	2,105	1,913	1,515	1,349	1,592	1,826

SOURCE: British Iron and Steel Federation, *op. cit.*, 1937, p. 88

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Table IX shows German pig-iron production according to quality. Basic pig iron was the most important variety produced, accounting in 1937-38 for between 65 percent and 70 percent of the total output. This is a reflection of the fact that German steel capacity is predominantly basic, whether open-hearth or Bessemer. The bulk of the remainder was made up of manganese pig iron and ferro-alloys, which together accounted for close to 25 percent of total output.

Table IX

GERMANY:[a] PRODUCTION OF PIG IRON AND FERRO ALLOYS
('000 metric tons)

Quality	1929	1935	1936	1937	1938
Hematite	1,091	662	742	743	1,718[b]
Basic	8,425	8,815	10,341	10,663	12,113
Bessemer	16	...	...	...	...
Foundry	1,163	813	1,007	973	b
Forge	11	185	223	277	337
Direct Castings	26	...	...	...	...
Manganese pig iron and ferro alloys	2,668	2,367	2,980	3,302	4,344
TOTAL	13,401	12,842	15,303	15,958	18,512[c]

SOURCE: 1929-37, British Iron and Steel Federation, op. cit. 1937.
1938, Report of the American Consulate at Cologne, March 1939

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[a] Including the Saar beginning March 1935

[b] Foundry pig iron included with hematite.

[c] Differs from the total in Table VII, mainly because of the inclusion of Austria.

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Table X

GERMANY: PRODUCTION, FOREIGN TRADE AND APPARENT CONSUMPTION OF PIG IRON AND FERRO ALLOYS, 1929-38[a]
('000 m.t.)

	1929	1935	1936	1937	1938
Production	13,401	12,842	15,303	15,958	18,512
Imports	117	98	113	160	445[b]
Exports	433	229	245	101	62[b]
Available for consumption	13,085	12,711	15,171	16,017	18,895

SOURCE: Unless otherwise noted, British Iron and Steel Federation, _op. cit._

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a Statistics include the Saar District beginning March 1935.

b _Monatliche Nachweise über den auswärtigen Handel Deutschlands_, Berlin, 1939

It is apparent from Table X that, although the amounts involved were sizeable, international trade in pig iron was of relatively small importance in prewar Germany. As a result domestic consumption of pig iron was pretty much the same as domestic production. On balance, Germany was usually a net exporter of the relatively small amounts of pig iron which crossed the borders. By 1937-38 this situation had changed and Germany was, in those years, a net importer. Imports, which were in the neighborhood of 1 to 2 percent of apparent consumption, came chiefly from

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France. Sweden, too, was an important source of high-grade charcoal pig iron for special purposes. Exports, which declined from about 3-1/2 percent of apparent consumption in 1929 to less than 1/2 of 1 percent in 1938, usually went chiefly to Sweden, Denmark and Switzerland.

F. Steel

Germany's production of steel ingots and castings showed a steady growth in the years before the war and by 1938 stood at about 23 million m.t. or almost 1/2 again as much as in 1929. Output for selected years is shown in Table XI, according to the various processes of steel production. Throughout the period of increasing output about 1/2 of German production was from open-hearth furnaces. The Basic Bessemer process was also of great importance and in 1938 accounted for about 40 percent of the total output of ingots and castings. The importance of Basic Bessemer steel making is probably related to the fact that French "minette" ores are normally used quite extensively in the German industry. The greater relative importance of open-hearth steel production, however, means that the German steel industry, as a whole, unlike the French industry, is able to economize in the use of ore, which

[redacted]

Germany does not have in abundance, by substituting scrap for pig iron in the steel-furnace charge. Table IV indicates that about 7 million tons of scrap were consumed by steel plants in 1936 and 1937: this went almost entirely into the production of about 11 million tons of non-Basic Bessemer steel production. On the whole the German industry consumed about two-thirds pig iron and one-third scrap in its steel production. (Table IV and Table X).

The regional distribution of steel output, as summarized in Table XII, is very much like the regional distribution of pig-iron output (Table VII.) The most important pre-war producing district was Rhineland-Westphalia which, even after the incorporation of the Saar, acounted for about 70 percent of total output. The Saar, with somewhat more than 10 percent in 1938, was the second most important single district. The remainder was accounted for by widely scattered regions.

The production of finished steel products and of semi-finished steel for sale is shown in Table XIII. By 1938 the output of finished steel aggregated more than 16 million tons. The largest single item in this total was steel bars and sections -- chiefly

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Table XI

GERMANY:[a] PRODUCTION OF STEEL INGOTS AND CASTINGS
BY PROCESS
('000 m.t.)

	1929	1935	1936	1937	1938[b]
Ingots					
Bessemer basic	7,394	6,885	7,873	7,958	9,309
Open-hearth acid	144	176	183	165	--[c]
Open-hearth basic	8,224	8,652	10,157	10,494	12,124
Castings					
Electric and crucible steel	209	362	499	700	775[d]
Basic	187	243	305	317	816[d]
Acid	88	46	57	65	
Bessemer acid		83	134	150	
TOTAL	16,246	16,447	19,208	19,849	23,024

SOURCE: 1929-37, British Iron and Steel Federation, *op.cit.*
1938, *Wirtschaft und Statistik*, Feb. 1939, p. 134.

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a Including the Saar beginning March 1935.

b Including Austria

c Figures for open hearth acid not stated in source.

d This figure is considerable higher than in earlier years. Possibly other varieties are included here although not specified.

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Table XII

GERMANY: PRODUCTION OF STEEL INGOTS AND CASTINGS BY DISTRICT
('000 m.t.)

	1929	1935	1936	1937	1938
Rhineland-Westphalia	13,172	11,318	13,356	13,736	16,008
Siegerland and Hessen Nassau	382	357	412	439	448
Silesia, Northern, Eastern, and Central Germany	1,828	1,820	2,153	2,325	2,509
Saxony	582	506	590	595	681
Southern Germany and Bavaria Palatinate	283	318	373	403	408
Saar district	...	2,127	2,323	2,350	2,573
TOTAL	16,246	16,447	19,208	19,849	23,242[a]

SOURCE: 1929-37, British Iron and Steel Federation, 1937, *op. cit.*, p. 94
1938, *Wirtschaft und Statistik*

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[a] The difference between this total and the total shown in Table XI is due chiefly to the exclusion of Austria. There is, in addition, a descrepancy between the two sets of figures which cannot be resolved.

small shapes -- which accounted for more than 30 percent of the total tonnage. Other important products in terms of tonnage were plates, sheets, girders, beams, and other large shapes, railway structure material, and tubes. Each of these categories accounted for something like 10 percent of total output. The regional distribution of finished steel production -- much like that of raw steel -- is shown in Table XIV.

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Table XIII

GERMANY:[a] FINISHED STEEL BY PRODUCT AND SEMI-FINISHED STEEL FOR SALE
('000 m.t.)

PRODUCT	1929	1935	1936	1937	1938
Semi-finished for sale	1,167	852	965	1,019	482
Finished steel					
Rails, sleepers and fish plates	1,442	909	946	865	1,203
Girders, beams, etc.	994	1,112	1,461	1,236	1,233
Steel bars, sections etc.	3,043	3,462	4,067	4,531	5,205
Hoop and strip	482	682	773	814	945
Wire rods	1,171	1,055	1,142	1,208	1,436
Universal flats	205	225	303	308	378
Plates, 4.76 mm. and over	1,073	978	1,249	1,438	1,865
Plates, 3 mm. and under 4.76 mm.	221	255	303	319	373
Sheets under 3 mm.	988	1,087	1,328	1,333	1,444
Tinplates	144	246	239	267	247
Tubes	906	810	1,036	1,126	1,182
Rolling stock material	170	121	131	168	225
Forgings	255	339	392	437	307
Other finished steel	199	136	44	67	124
Total finished	11,293	11,418	13,414	14,118	16,366
Total finished and semi-finished	12,460	12,270	14,379	15,137	16,848

SOURCE: 1929-37, British Iron and Steel Federation, op. cit.
1938, Report of the American Consulate at Cologne, March 1939.

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[a] Includes the Saar beginning March 1935.

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Table XIV

GERMANY: PRODUCTION OF FINISHED STEEL BY DISTRICT
('000 m.t.)

	1929	1935	1936	1937
Rhineland-Westphalia	8,704	7,417	8,799	9,282
Siegerland and Hessen-Nassau	566	515	582	616
Silesia, Northern, Eastern and Central Germany	1,202	1,282	1,524	1,605
Saxony	473	357	408	438
Southern Germany	247	292	335	353
Saar	...	1,556	1,765	1,825
TOTAL	11,292	11,419	13,414	14,118

SOURCE: 1929-37, British Iron and Steel Federation, 1937, op. cit., p. 94

In addition, there was, in all years a substantial production of semi-finished steel for sale. In all years except 1938 about 1 million tons of such semi-finished products as ingots, blooms, billets, and slabs were usually sold.

German foreign trade in iron and steel products is summarized in Table XV. Exports from Germany to the outside world were substantially higher than imports in all years. In 1929, both exports and imports were at a level not equalled in any of the immediate pre-

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Table XV

GERMANY:[a] IMPORTS AND EXPORTS OF IRON AND STEEL PRODUCTS
('000 m.t.)

	1929		1935		1936		1937	
	Im-port	Ex-port	Im-port	Ex-port	Im-port	Ex-port	Im-port	Ex-port
Ingots, billets, blooms, and slabs	135	468	58	156	46	191	67	111
Girders and structural iron and steel	263	309	129	158	116	187	97	193
Sections and bars and hoops	415	1,149	217	710	157	782	158	955
Plates and sheets, 4.76 mm. and over	37	414	8	152	2	185	2	190
Plates and sheets, over 1 mm. and under 4.76 mm.	18	118	7	106	5	134	2	87
Plates and sheets, 1 mm. and under	16	103	26	76	18	90	14	64
Tinned plates, galvanized sheets and other coated plates	32	81	12	156	6	173	6	175
Rails, sleepers, and fishplates	110	391	36	261	15	241	9	204
Railway wheels and axles	1	62	b	53	1	48	b	51
Other railway material	14	39	b	17	b	20	b	27
Wire, rolled or drawn	99	457	26	186	10	197	11	240
Other wire goods	4	183	1	130	b	125	b	122
Pipes and fitting, cast	58	121	4	84	b	94	b	100
Pipes and fitting, wrought	18	368	5	233	5	374	3	442
Manufactures of cast iron	31	258	8	115	10	148	7	205
Machine parts and other castings	15	189	3	68	b	63	1	73
Screws, nails, and rivets	3	47	1	36	b	46	b	53
Other items	12	384	4	214	7	263	3	296
TOTAL	1,283	5,142	547	2,913	403	3,365	382	3,585

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SOURCE: British Iron and Steel Federation, op.cit.

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[a] Includes the Saar beginning March 1935.
[b] Under 500 tons.

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war years although production was considerably higher in these years. Exports tended to hold up better than imports but still the net export balance was greater in 1929 than in 1935-37. In absolute terms exports varied between about 3 and 5 million tons while imports varied between 400 thousand tons and about 1.3 million tons. The chief items of export were sections, bars, and hoops; pipes and fittings; railway material; girders and structural iron and steel; tinned and other coated plates; plates and sheets; manufactures of cast iron and semi-finished steel. Imports consisted mainly of semi-finished steel; girders and structural iron and steel; and sections, bars, and hoops.

The German steel industry relied quite heavily on the export market as Table XVI shows.[1] In 1936-1937 exports accounted for somewhat less than

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[1] A note of caution should be introduced with regard to the comparisons in Table XVI. It is altogether likely that the production and trade figures are not entirely comparable and that the trade figures include certain classes of output not included in production. Hence exports and imports as a percent of production may be overstated. The amount of overstatement is probably not great.

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Table XVI

GERMANY:[a] PRODUCTION, FOREIGN TRADE AND APPARENT CONSUMPTION OF FINISHED AND SEMI-FINISHED IRON AND STEEL

('000 m.t.)

	1929	1935	1936	1937
Finished:				
Production	11,292	11,418	13,414	14,118
Imports	1,148	489	455	315
Exports	4,674	2,757	3,174	3,474
Available for consumption	7,766	9,150	10,695	10,959
Semi-finished:				
Production	1,167	852	965	1,019
Imports	135	58	48	67
Exports	468	156	191	111
Available for consumption	834	754	822	995

SOURCE: Tables XIII and XIV

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a. Includes the Saar beginning March 1935.

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25 percent of domestic production of finished steel products, while imports were about 2 - 3 percent of home production. Exports were particularly high in 1929 when more than 40 percent of domestic output of

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finished steel went into exports: at the same time, however, more than 1 million tons or about 10 percent of domestic production was imported. In all of these years, net exports were between 20 and 30 percent of domestic production. In addition, there was some foreign trade in semi-finished steel. In 1929 net exports of semi-finished steel were about 30 percent of domestic production, but both the amounts and relative importance declined in more recent years.

Exports and imports according to country are shown in Tables XVII and XVIII. In 1929, when imports were quite large, France (particularly the Saar) provided about 75 percent of the total, and Luxemburg was second with somewhat more than 10 percent of the total. In the much smaller 1937 total, Luxemburg was first with about 75 percent of the total, with the remainder scattered. The much larger exports were not dominated to the same extent by any one or two countries. The Netherlands seemed to take most of the exports and in 1929 accounted for something like 20 percent of the total. The United Kingdom, which was second to the Netherlands in 1929 with about 15 percent of the total, declined considerably in later years, although still remaining a fairly important customer.

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During the entire period Denmark was also a fairly large importer of German iron and steel, probably ranking second to the Netherlands over time. However, the bulk of the German exports went in all years -- and particularly in recent years -- to a large number of individual nations which accounted singly for a relatively small percentage of total German exports.

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Table XVII

GERMANY: EXPORTS OF SEMI-FINISHED AND FINISHED IRON AND STEEL PRODUCTS BY COUNTRY OF DESTINATION

('000 m.t.)

	1929	1935	1936	1937
Sweden	153	127	150	183
Denmark	192	204	297	296
Netherlands	972	341	240	529
Switzerland	103	103	125	149
Greece	16	86	94	112
Turkey	46	122	151	77
China	75	147	173	139
Japan	312	111	92	70
United States	148	106	104	79
Brazil	152	154	183	172
Argentina	259	80	75	147
United Kingdom	790	96	134	159
South Africa	107	89	80	86
British India	131	106	121	101
Unallocated	1,685	1,039	1,341	1,284
TOTAL	5,142	2,910	3,365	3,583

SOURCE: 1929-1936, U.S. Tariff Commission, op.cit. p. 160
1937, British Iron and Steel Federation, op.cit.

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Table XVIII

GERMANY: IMPORTS OF FINISHED AND SEMI-FINISHED IRON AND STEEL PRODUCTS BY COUNTRY OF ORIGIN
('000 m. t.)

	1929	1935	1936	1937
Sweden	21	..	..	27
Netherlands	..	..	..	1
Belgium	49	..	..	32
France	930[a]	..	..	1
Luxemburg	153	..	..	276
Poland	..	..	..	18
Czechoslovakia	34	..	..	7
Austria	..	..	..	½[b]
United States	..	..	..	½[b]
United Kingdom	26	..	..	5
Others and unallocated	50	..	..	16
TOTAL	1,283	..	..	383

SOURCE: British Iron and Steel Federation, op.cit., 1929, 1937

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[a] Including 724,000 tons from the Saar.

[b] Less than 500 tons.

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III. BELGIUM-LUXEMBURG

A. Introduction

Belgium and Luxemburg are grouped in this discussion because data on imports and exports of the two countries can usually not be separated. Joint reporting of international trade resulted from the Customs Union which the two countries formed after the last war and which continued until the outbreak of this war. To the extent that separation of the data is possible each country is covered separately.

Both Belgium and Luxemburg were important steel producers. In pre-war years they ranked third and fourth respectively among continental steel producers (excluding USSR): they were outranked only by Germany and France. Neither country is particularly well-endowed with either iron ore or coal, but each country has enough of one or the other material to provide some sort of natural base for the industry. Belgium has substantial supplies of coal and produced some coke, but her iron-ore resources are very poor. Luxemburg has extensive iron-ore resources but is almost completely lacking in coal and coke. The chief advantage of Belgium, in particular in the international steel market, apparently derived from the nearness of steel plant to the seaboard, which

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resulted in relatively low transport costs -- an item of great importance in the final delivered costs of tonnage grades of steel.

B. Iron Ore

Figures of iron-ore production in Belgium and Luxemburg are shown in Table I. The output of Belgian iron-ore mines (chiefly in the Campine district) was of negligible importance. Iron-ore production in Luxemburg was fairly substantial; during the years shown in Table I her annual iron-ore output varied between 4 and 8 million tons -- approximately the same level as production in Germany before the pre-war spurt in German production. The iron-ore fields of Luxemburg are a continuation of French Lorraine and the ores are in large part similar to those produced in French Lorraine: the iron content varies between 30 and 33 percent and the ores can be combined to produce a self-fluxing mixture. The reserves of iron ore in Luxemburg have been estimated to be about 270 million tons averaging about 33 percent iron content; Belgium reserves have been estimated at about 60 million tons of about the same grade.[1]

In Table II the combined statistics of

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[1] Wright, op. cit., 3

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Table I

BELGIUM-LUXEMBURG: IRON ORE PRODUCTION
('000 m.t.)

	1929	1935	1936	1937	1938
Belgium	156	165	191	266	181
Luxemburg	7,571	4,134	4,896	7,766	5,141
Petange-Differdange	3,599	2,401	2,860	3,853	2,665
Rumelange-Dudelange	1,922	984	1,234	2,890	1,883
Esch	2,050	749	802	1,023	593
TOTAL BELGIUM-LUXEMBURG	7,727	4,299	5,087	8,032	5,322

SOURCE: 1929, Weltmontanstatistik, II, 1920-1930, F. Meisner, Stuttgart, 1932, p. 166; 1935-38, Luxemburg, Bulletin du Comité des Forges de France, August 1939; Belgium, The Mineral Industry, 1940; Tariff Commission, op. cit.

Table II

BELGIUM-LUXEMBURG: PRODUCTION, FOREIGN TRADE
AND APPARENT CONSUMPTION OF IRON ORE
('000 m.t.)

	1929	1935	1936	1937	1938
Production	7,727	4,299	5,087	8,032	5,322
Imports	14,056	10,583	10,718	12,410	9,394
Exports	818	842	935	2,283	2,047
Available for consumption	20,965	14,038	14,870	18,159	12,669

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Belgium and Luxemburg for production and foreign trade in iron ore are shown. Before 1937 imports were about twice as large as domestic production, and, since this was accompanied by extremely small exports, the amount of iron ore available for consumption in Belgium and Luxemburg was almost 3 times home production in these years. In 1937 and 1938 home production rose relative to imports but at the same time exports increased markedly.

Ores imported into the Customs Union came almost entirely from France and were used in the steel industries of both countries. About 2/3 of the imported ore was consumed by Belgian producers and the remainder was consumed by Luxemburg producers who mixed these ores with domestic ores. Ores exports, normally small, exceeded 2 million tons in both 1937 and 1938. The great increase over earlier years when less than 1 million tons crossed the border was due to extensive takings by Germany. Normally Germany and France accounted for almost all of the ore exports. A large part of imports and exports consisted of short cross-border hauls where transport costs were cheaper than within the country.

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Table III

BELGIUM-LUXEMBURG: IMPORTS AND EXPORTS OF IRON ORE, BY COUNTRY
('000 m.t.)

	1929	1935	1936	1937	1938	1939
IMPORTS						
France	13,221	10,265	10,165	11,529	8,600	9,627
Algeria	....	29	95	80	156	135
Norway	550	206	298	397	19	41
Sweden	....	13	83	266	549	213
Other	81	19	77	138	69	97
TOTAL	14,057	10,583	10,718	12,410	9,394	10,113
EXPORTS						
Germany	357	367	632	1,628	1,829	1,474
France	438	426	275	620	208	161
Sweden	...	13	9	9	1	...
Netherlands	...	32	16	23	8	...
Other	23	5	3	3	1	10
TOTAL	818	842	935	2,283	2,047	1,646

SOURCE: 1929 and 1935, U. S. Tariff Commission, *op. cit.*
1936 and 1937, British Iron and Steel Federation, *op. cit.* 1937
1938 and 1939, Bureau of Mines, Foreign Minerals Division Files.

C. *Scrap*

The Belgium-Luxemburg Customs Union was a large net exporter of scrap with exports second only to

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those of France among continental nations. The large export surplus was due to the fact that the steel industries in the two countries were limited in the amount of scrap they could consume, by the prevalence of the Basic Bessemer process of steel making, while at the same time large amounts of scrap were generated in the steel-production and fabricating processes. Scrap consumption and exports by the two countries combined are shown for selected pre-war years in Table IV.

Table IV

BELGIUM-LUXEMBURG: SCRAP CONSUMPTION AND NET EXPORTS,
1929-1938
('000 m.t.)

	1929	1935	1936	1937	1938	1939
Consumption	...	782	853	1,214	...	...
Blast furnaces	...	242	280	464	...	...
Steel Plants	...	460	493	660	...	...
Iron foundries, etc.	...	80	80	90	...	...
Net Exports	165	359	439	219	350	330

SOURCE: 1929 38, Hermberg, op. cit.
1939, Bureau of Mines, Foreign Minerals Division Files.

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D. Coal and Coke

Table V shows production, foreign trade, and apparent consumption of coal and coke in Belgium and Luxemburg. Coal production fluctuated between about 26 and 30 million tons and was entirely from Belgium. In all years both imports and exports of coal were sizable. On balance, the Customs Union was in some years a net importer and in others a net exporter. Thus in 1929 net imports were about 7½ million tons, while in the years 1935-39 the Customs Union was a net exporter by rather small margins. Coal was imported at the same time as domestic coal was exported in order to provide sufficient coal of coking quality. Germany was the chief source of such coal, accounting for between 40 and 60 percent of imports from 1929 to 1937. The Netherlands and United Kingdom were also important sources.

Coke production in Belgium-Luxemburg was, in the years shown, somewhere in the neighborhood of 5 million tons. In 1929, the year of peak output, production reached 6 million tons and, in the same year, net imports were about 2.7 million tons. Belgium-Luxemburg imported coke even in those years

Table V

BELGIUM-LUXEMBURG: PRODUCTION, FOREIGN TRADE, AND APPARENT CONSUMPTION OF COAL AND COKE
('000 m.t.)

COAL	1929	1935	1936	1937	1938	1939
Production	26,940	26,506	27,867	29,859	29,575	29,874
Imports	11,385	3,777	3,871	6,167	4,494	3,538
Exports	3,790	4,281	4,735	4,316	4,674	4,989
Available for consumption	34,535	26,002	27,003	31,710	29,395	28,423
COKE						
Production	5,952	4,444	4,532	5,522	4,703	5,177
Imports	3,405	2,279	2,557	3,186	1,938	1,988
Exports	738	919	1,250	1,320	1,204	1,630
Available for consumption	8,619	5,804	5,839	7,388	5,437	5,535

SOURCE: 1929-38, Statistische Übersicht über die Kohlenwirtschaft im Jahre, 1937-38,
1939, Bureau of Mines, Minerals Yearbook, 1942

when consumption was below the production level attainable in the country (as determined by peak-year output). Only in 1938 and 1939 did net imports become quite small; otherwise they were between 20 and 30 percent of the amounts available for consumption.

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D. Pig Iron

The combined peak pig-iron production of Belgium and Luxemburg was about 7 million tons per year. Production was usually below this peak level and during the period 1935-39 varied between 4.0 and 6.4 million tons. Belgium was the larger producer of the two, accounting for about 3/5 of total output. Within Belgium the most important producing district was Charleroi, which produced about 50 percent of Belgium's output. Liege accounted for about 35 percent of the total and South Luxemburg (not to be confused with Luxemburg) for the remainder.

The Belgium-Luxemburg Customs Union engaged in a small amount of international trade in pig iron. As Table VII shows, until 1938-1939 imports ran between 5 and 10 percent of domestic production. Net imports were smaller since pig iron was also exported. Pig-iron trade consisted almost entirely of short cross-border hauls.

Materials consumed in the production of pig iron and ferro-alloys in Belgium and Luxemburg in 1936 are shown in Tables VIII and IX. One fact which emerges is that Luxemburg consumed slightly more foreign ore than domestic; Luxemburg producers chose

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Table VI

BELGIUM-LUXEMBURG: PIG IRON AND FERRO-ALLOY PRODUCTION
('000 m.t.)

	1929	1935	1936	1937	1938	1939
Belgium	4,041	3,030	3,161	3,804	2,426	3,059
Charleroi	2,179	1,548	1,631	1,957	1,291	.....
Liege	1,502	1,141	1,136	1,406	833	.....
South Luxemburg	360	341	394	441	303	.....
Luxemburg	2,906	1,872	1,987	2,513	1,551	1,800
TOTAL	6,947	4,902	5,148	6,356	4,016	4,859

SOURCE: 1929-1937, Bulletin Comité des Forges. Statistique de la Production Sidurgique pour l'Annee, Feb. 1939.
1938, Annales des Mines de Belgique, 1939, Vol. XI, Table XIII
1939, U. S. Bureau of Mines, Minerals Yearbook, 1942

Table VII

BELGIUM-LUXEMBURG: PRODUCTION, IMPORTS, EXPORTS, AND APPARENT CONSUMPTION OF PIG IRON AND FERRO-ALLOYS
('000 m.t.)

	1929	1935	1936	1937	1938	1939
Production	6,947	4,902	5,148	6,356	4,016	4,859
Imports	674	204	280	308	117	166
Exports	119	42	63	49	184	128
Available for Consumption	7,502	5,064	5,365	6,615	3,949	4,897

SOURCE: 1929-37, British Iron & Steel Federation, op.cit.
1938-39, US Bureau of Mines, Minerals Yearbook; Files of the Foreign Minerals Division of the US Bureau of Mines

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Table VIII

BELGIUM: MATERIALS CONSUMED IN THE PRODUCTION OF PIG IRON AND FERRO-ALLOYS, 1936
('000 m.t.)

District	Iron Ore	Manganese Ore	Scrap, cinder, Etc.	Coal	Coke Belgian	Coke Foreign	Other fuel, briquettes, Etc.
Charleroi	4,058	55	513	2	1,498	....	3
Liege	2,832	36	293	10	961	112	9
South Luxemburg	1,280	11	56	a	383	38	3
TOTAL	8,170	102	862	12	2,841	151	16

SOURCE: British Iron and Steel Federation, *op. cit.*

Table IX

LUXEMBURG: MATERIALS CONSUMED IN PRODUCTION OF PIG IRON, 1936-37
('000 m.t.)

	1936	1937
Ore:		
Home	3,193	4,302
Foreign	3,757	4,736
Coke	2,216	2,956

SOURCE: British Iron and Steel Federation, *op. cit.*

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a Less than 500 tons.

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to mix their own ores with French Lorraine ores mainly because of fuel economies achieved thereby.

F. Steel

Production of steel ingots and castings in Belgium and Luxemburg is shown in Table X. In 1929, which was a peak year, output for the two countries was 6.8 million tons, of which Belgium produced 4.1 million and Luxemburg 2.7. During 1935-38 production was on a generally lower level, running between 3.7 and 6.4 million tons for the two combined. In general the relative importance of the two countries was the same as in pig iron, with Belgium producing about 3/5 of the total.

Table X

BELGIUM-LUXEMBURG: PRODUCTION OF STEEL
('000 m.t.)

	1929	1935	1936	1937	1938
Belgium	4,110	3,023	3,168	3,869	2,285
Luxemburg	2,702	1,837	1,981	2,510	1,437
TOTAL	6,812	4,859	5,149	6,379	3,722

SOURCE: 1929-37, Annales des Mines de Belgique,
British Iron and Steel Federation, op. cit.
1938, Bulletin Comité des Forges de France, July 1939, p. 26.

In Tables XI and XII, the steel production of the two countries is shown according to process

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Table XI

BELGIUM: PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESS AND DISTRICT IN 1936
('000 m.t.)

Process	Composite Works		Steel Works not attached to blast furnaces	Independent steel foundries	Quantity
	Hainaut and Brabant	Liege and Luxemburg	Hainaut and West Flanders		
Ingots:					
Thomas converter	1,521	1,210	1	...	2,732
Open hearth	8	222	102	...	333
Electric	3	37	...	a	40
Castings:					
Converter	2	1	2	41	45
Open hearth	6	8	1	1	16
Electric	1	...	...	2	3
TOTAL	1,540	1,479	105	44	3,168

SOURCE: British Iron and Steel Federation, op. cit.

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a Less than 500 tons.

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and, in Belgium, according to producing district. The regional distribution of steel production in Belgium was about the same as for pig iron, with the Provinces of Hainaut and Brabant in which the Charleroi District is included, producing about 80 percent of the total. The remainder was accounted for by the Provinces of Liege and Luxemburg. The close correlation between regional production of pig iron and steel is to be expected since, as Table XI also reveals, steel production is almost entirely in the hands of composite works. It may be concluded from this that the steel production of the provinces of Liege and Luxemburg was accounted for mainly by Liege (cf. Table XI). The Luxemburg industry was concentrated in the iron-mining district.

In both Belgium and Luxemburg the Thomas (Basic Bessemer) process of steel production was of overwhelming importance. In Luxemburg, in particular, the production of steel by other methods was negligible. The widespread use of this process, as in the case of France, was related to the fact that cheap iron-ore was more readily available than coal, making economy in fuel utilization more important than economy in ore

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Table XII

LUXEMBURG: PRODUCTION OF STEEL INGOTS AND CASTINGS
BY PROCESS IN 1936 AND 1937
('000 m.t.)

Process	1936	1937
Basic Bessemer ("Thomas")	1,965	2,492
Open Hearth	7	9
Electric	9	9
TOTAL	1,981	2,510

SOURCE: British Iron and Steel Federation, op. cit

consumption. (cf. Benham, op. cit.) As a result of the prevalence of Thomas steel-making, relatively little scrap was consumed by the steel industry in Belgium and Luxemburg. This is seen in Tables XIII and XIV, which indicate that the iron charged into the steel furnace was preponderantly pig iron. The ratio of pig iron to scrap was about 7:1 in Belgium and about 10:1 in Luxemburg.

Tables XV - XIX summarize the production and foreign trade of Belgium and Luxemburg in finished steel products and in semi-finished steel for sale. Production is shown in Tables XV and XVI. The leading classes of output in Belgium were semi-finished steel for sale; merchant bars; plates; structural material; wire; strip and rods. There is little detail in the Luxemburg statistics; each class of output, as shown, accounted for a high percentage of

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Table XIII

BELGIUM: MATERIALS CONSUMED IN THE PRODUCTION OF STEEL INGOTS AND CASTINGS, 1936
(:000 m.t.)

Process	Composite Works		Steel Works not attached to blast furnaces	Independent steel foundries	Total
	Hainaut and Brabant	Liege and Luxemburg	Hainaut and West Flanders		
Pig Iron:					
Belgian	1,636	1,356	3	12	3,007
Foreign	19	19	35	15	87
Ore:	...	2	...	1	2
Scrap:	63	279	81	37	459
Coal:					
Belgian	4	6	13	7	30
Foreign	...	8	16	a	24
Coke:					
Belgian	13	7	2	16	38
Foreign	...	2	...	1	3

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SOURCE: British Iron and Steel Federation, op. cit.

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a Less than 500 tons.

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Table XIV

LUXEMBURG: MATERIALS CONSUMED IN PRODUCTION OF STEEL INGOTS AND CASTINGS, 1936 - 1937
('000 m.t.)

	1936	1937
Pig iron	2,003	2,540
Scrap	188	238
Limestone and dolomite	260	335

SOURCE: British Iron and Steel Federation, op. cit.

total output. The most important groups were semi-finished steel for sale; joists and large shapes (mainly structural); and bars and small shapes.

The marked dependence of the Belgium-Luxemburg steel industry on the export market appears clearly in the figures in Table XVII. Exports of finished and semi-finished steel products in the years shown averaged approximately 70 percent of domestic production. Net exports were only slightly less since imports were quite unimportant. As Table XVIII indicates, the large exports of the two countries consisted mainly of low-priced tonnage grades of steel, including semi-finished type products which could be fabricated further by the steel industries of other countries.

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Exports of steel products from Belgium-Luxemburg according to markets are shown in Table XIX. The United Kingdom and Ireland were the most important customers during the entire period shown. In 1929, when exports were at a peak, they accounted for something like 25 percent of the total exported; in other years their share of the total fell to about 1/6. The United Kingdom was a particularly heavy buyer of the semi-finished products which were an important component of Belgium-Luxemburg exports. Other important customer nations were Germany, the Netherlands, the Argentine, and Sweden. Each of these accounted for between 5 and 10 percent of exports in most years. Exports to India, which had been second most important in 1929, declined rapidly during this period. A large part of the total was made up of exports to countries of rather small individual importance and not shown separately in the tabulation.

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Table XV

BELGIUM: PRODUCTION OF FINISHED STEEL AND SEMI-FINISHED STEEL FOR SALE
('000 m.t.)

	1929	1935	1936	1937	1938
Semi-finished for sale					
Blooms and billets	...	...	436	540	265
Slabs and sheets	...	...	355	354	189
Total semi-finished	786	679	791	894	454
FINISHED					
Merchant bars	890	550	519	636	358
Special sections	416	245	308	289	182
Structural and U's	201	138	152	207	120
Rails	163	57	63	97	56
RR accessories	47	15	13	31	9
Sleepers	85	51	35	92	48
Tires	30	20	11	19	15
Wire	272	176	192	236	127
Strip	65	202	188	223	122
Rods	51	166	151	192	161
Universal plates	104	39	36	31	25
Large plates	228	292	267	360	198
Medium plates	196	141	162	153	109
Fine plates	387	208	308	256	177
Forged steel	32	21	12	2	2
Steel tubes	...	49	62	62	45
Total finished steel	3,167	2,370	2,479	2,888	1,754

SOURCE: 1929-36, Bulletin Comité des Forges de France.
1937, Annales des Mines de Belgique, Vol. 38, Table XI
1938, Annales des Mines de Belgique, Vol. 39, Table XI

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Table XVI

LUXEMBURG: PRODUCTION OF FINISHED STEEL AND SEMI-FINISHED STEEL FOR SALE
('000 m.t.)

	1929	1935	1936	1937
Semi-finished for sale	217	241	313	365
FINISHED				
Permanent way material	193	81	86	110
Joists and large shapes	417	327	401	479
Bars and small shapes	970	619	526	805
Wire rods	127	92	86	98
Strip	91	72	76	88
Plates and flats	112	96	112	116
Total finished	1,910	1,287	1,288	1,696
Total finished and semi-finished	2,127	1,728	1,601	2,061

SOURCE: 1929-36, U. S. Tariff Commission, op. cit.
1937, British Iron and Steel Federation, op. cit.

Table XVII

BELGIUM-LUXEMBURG: PRODUCTION, FOREIGN TRADE, AND APPARENT CONSUMPTION OF FINISHED AND SEMI-FINISHED STEEL PRODUCTS
('000 m.t.)

	1929	1935	1936	1937
Production	6,080	4,777	4,871	5,843
Imports	318	94	128	121
Exports	4,469	3,209	3,165	3,918
Available for consumption	1,929	1,662	1,834	2,046

SOURCE: Tables XV - XVII. Imports from U.S. Tariff Commission, op. cit., and Bulletin Mensuel du Commerce Belgique-Luxembourg.

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Table XVIII

BELGIUM-LUXEMBURG: EXPORTS OF SEMI-FINISHED AND FINISHED STEEL BY PRODUCT
('000 m.t.)

	1929	1935	1936	1937
Semi-finished:				
Ingots	36	6	a	16
Billets and sheet bars	421	295	343	411
Slabs and blooms	25	34	17	16
Total semi-finished	482	335	360	443
FINISHED:				
Sections, T's, U's, etc.	604	556	546	676
Iron and steel bars, solid rolled and drawn	1,487	1,014	889	1,165
Plates and sheets	575	449	455	654
Plates and sheets coated, etc.	104	125.	185	
Hoops and strips	172	176	179	211
Rails	188	65	53	135
Tires and axles	14	4	3	6
Sleepers and fish plates	106	64	45	50
Wire and wire rods	394	226	235	342
Barbed wire	32	20	27	32
Nails and screws	36	34	34	38
Pipes and fittings	64	35	48	51
Other manufactures of iron and steel	17	7	10	12
Other products	194	99	97	103
Total finished and semi-finished	4,469	3,209	3,165	3,918

SOURCE: U. S. Tariff Commission, op. cit.

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a Less than 500 tons.

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Table XIX

BELGIUM-LUXEMBURG: EXPORTS OF SEMI-FINISHED AND FINISHED IRON AND STEEL, BY COUNTRY
('000 m.t.)

	1929	1935	1936	1937
United Kingdom and Ireland	1,074	577	534[a]	595
Germany	183	263	293	316
Netherlands	269	242	278	391
China	246	165	154	179
Argentina	232	310	260	385
Japan	197	100	59	122
Sweden	90	149	184	211
India and Ceylon	359	128	98[b]	95
Egypt and Palestine	107	124	78	90
United States	122	67	111	130
All other countries	1,590	1,085	1,119	1,399
TOTAL	4,468	3,210	3,166	3,903

SOURCE: 1929-36, U. S. Tariff Commission, *op. cit.*, pp. 188-190
1937, British Iron and Steel Federation, *op. cit.* pp. 113-115.

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IV. CZECHOSLOVAKIA

A. Introduction

Pre-1938 Czechoslovakia was one of the larger steel-producing countries of Europe with a level of output about the same as that of Italy and Luxemburg. The industry had a natural base in the Upper Silesian coal fields within the Czechoslovakian borders, and in the deposits of iron ore in Bohemia and Slovakia. Iron-ore production had to be supplemented by outside sources, but coal resources were ample.

There is a strong likelihood that Czechoslovakian steel capacity, particularly rolling-mill facilities, has been expanded during the war. The Germans are known to have made efforts to expand production in the Silesian industrial district and post-war Czechoslovakia may benefit from these efforts. There is no precise information on the extent of such changes, but they are not believed to be sufficiently large to alter the position of the Czechoslovakian industry vis-a-vis other European producers.

B. Iron Ore

Production of iron ore in Czechoslovakia, for selected pre-war years is shown in Table 1. Output came mainly from two districts: South Central

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Slovakia, west of Kosice; and the neighborhood of Nucice, Bohemia. In 1937 the Slovakian mines produced close to 1 million tons of ore containing 32 to 38 percent iron. The mines in Bohemia apparently produced upwards of 600,000 tons of ore averaging 37 percent iron. The remaining output -- in the neighborhood of 150,000 tons of 30 percent ore -- was from the vicinity of Trzynice in the Olzan district.[1] Reserves of iron ore in Czechoslovakia have been estimated at 61 million tons of proved ore and an additional 400 million tons of possible ore.[2]

The data in Table 1 indicate that domestic production of ore normally accounted for only about 60 percent of domestic ore requirements. Imports of ore were mainly from Sweden and Yugoslavia and were of a substantially higher quality than domestic ores, so that, in terms of metallic content, reliance on foreign sources was more pronounced than these figures would suggest. At the same time, small quantities of ore were exported, particularly to Hungary.

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[1] Wright, op. cit., 29-30, 39.

[2] Rankin, Karl L., Czechoslovak Iron and Steel Industry, U. S. Dept. of Commerce, Trade Information Bulletin, No. 713, 2.

[redacted]

Table I

CZECHOSLOVAKIA: PRODUCTION, FOREIGN TRADE, AND
APPARENT CONSUMPTION, IRON ORE, 1929-37
('000 m.t.)

	1929	1935	1936	1937
Production	1,809	731	1,090	1,740
Imports	...	549	555	1,500
Exports	...	82	74	182
Available for Consumption	3,096	1,198	1,571	3,058

SOURCE: Wright, *op. cit.*
Statistisches Jahrbuch für die Eisen-und Stahlindustrie

C. Scrap Iron

Owing to the predominance of the open-hearth method of steel making, the Czechoslovak industry consumed relatively large amounts of scrap in steel production. Not enough scrap was generated within the country to satisfy steel-industry requirements; Czechoslovakia, hence, was a net importer of scrap. Imports in 1937 were mainly from the Netherlands and Belgium-Luxemburg. The salient data on scrap are shown in Table II

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Table II

CZECHOSLOVAKIA: SCRAP CONSUMPTION AND FOREIGN TRADE
('000 m.t.)

	1929	1935	1936	1937
Consumption	...	530	670	1,100
Blast furnaces	...	56	67	100
Steel plants	...	474	603	1,000
Foreign trade				
Net imports[a]	292	57	84	256

SOURCE: Hermberg, *op. cit.*, *Statistische Jahrbuch für die Eisen und Stahl Industrie*

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a. These are equivalent to total imports, since exports were negligible.

D. Coal and Coke

Czechoslovakia had large resources of coking coal, particularly in the Ostrava-Karwin district. Her exports of coal averaged about 10 percent of production and normally imports were also of the same general order of importance. Her trade balance varied from a net importer to a net exporter of coal, normally by a small margin in either direction. Coke exports accounted for between 20 and 30 percent of domestic production with imports running between 5 and 10 percent. The salient data are shown in Table III.

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Table III

CZECHOSLOVAKIA: BITUMINOUS COAL AND COKE, PRODUCTION, FOREIGN TRADE, AND APPARENT CONSUMPTION
('000 m.t.)

	1929	1935	1936	1937
COAL				
Production	16,751	10,965	12,353	16,951
Imports	2,331	1,253	1,111	1,168
Exports	1,854	1,270	1,318	2,225
Available for Consumption	17,228	10,948	12,146	15,894
METALLURGICAL COKE				
Production	3,163	1,551	1,955	3,272
Imports	386	160	163	165
Exports	884	354	418	943
Available for consumption	2,665	1,357	1,700	2,494

SOURCE: Statistische Übersicht über die Kohlenwirtschaft im Jahre 1937-38

M. Pig Iron

Czechoslovakian pig-iron production, foreign trade and consumption are summarized in Table IV.

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Table IV

CZECHOSLOVAKIA: PIG IRON AND FERRO-ALLOYS PRODUCTION, FOREIGN TRADE, AND APPARENT CONSUMPTION
('000 m.t.)

	1929	1935	1936	1937
Production	1,645	810	1,140	1,675
Imports	a	11	25	36
Exports	51	6	8	9
Available for consumption	1,594	815	1,157	1,702

SOURCE: Wright, op. cit. British Iron and Steel Federation, op. cit.; Statischer Jahrbuch für die Eisen-und Stahl-Industrie

Peak pig-iron production was somewhere around 1.7 million tons per annum. Production was concentrated in two districts: about 15 miles west of Prague around the town of Kladno and in the more important Ostrawa-Karwin coal field in the vicinity of Witkowitz and Trzynitz. The blast furnaces in the Prague neighborhood relied mainly on iron ore mined in Bohemia. This ore has a rather high silica content so that it was mixed with imported basic ores with a higher iron content, probably from Yugoslavia. Coke had to be brought in from outside the district, largely from the Ostrau-Karwin district. The iron and steel plants in the Ostrau-Karwin district relied

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mainly on high-grade iron ore from Sweden, brought in by way of the Oder River. It is estimated that Swedish ores accounted for about 80 percent of the ore consumed in this district in 1937, with the Slovakian mines accounting for the remainder. Coke was, of course, at hand. The Silesian district was apparently the more important pig-iron producer of the two before the war.[1]

International trade in pig-iron was of small importance in pre-war Czechoslovakia. On balance the country was a small importer, but domestic consumption was almost identical with home production.

F. Steel

Production of steel ingots and castings in Czechoslovakia is shown in Table V. By 1937, the industry's output had reached about 2.3 million tons,

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[1] From scattered sources the following distribution of pig iron production (in '000 m.t.) in 1937 may be worked out:

Ostrava (Witicowitz)	800
Karwin (Trzynitz)	485
Bohemia	342
Solovakia	40
TOTAL	1,675

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a higher level than in 1929. Although the 1937 production is differentiated only roughly according to process, it is clear from the data for earlier years that production consisted mainly of ingots produced in basic open-hearth furnaces. In 1936, for example, basic-open-hearth ingot production was equal to about 80 percent of the total production of steel ingots and castings.

Table V

CZECHOSLOVAKIA: STEEL INGOTS AND CASTINGS
ACCORDING TO PROCESS, 1934-1937
('000 m.t.)

	1929	1935	1936	1937
Ingots •	...	1,127	1,459	...
Open-hearth, basic	1,765	961	1,210	2,041
Open-hearth, acid		12	27	
Thomas	244	111	156	229
Electric	71	44	66	48
Crucible				
Castings and other	...	25	37	
TOTAL	2,080	1,153	1,496	2,318

SOURCE: 1935-37, Bulletin du Comitè des Forges de France, May 1938, Czechoslovakia, p. 1

Table VI shows Czechoslovakian output of rolling-mill products and semi-finished steel for sale.

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Peak production of finished rolling-mill products in 1929 and 1937 was about 1.3 million tons, and almost half of this production was accounted for by an omnibus category which included bars, shapes, strip and mine rails. Rolled wire, rails, structural steel, thick and black plates, and structural steel together almost exhausted the remaining production. Semi-finished steel for sale was a particularly large item, outranking in volume any single class of rolling-mill production outside of bars, shapes, etc.

Table VI

CZECHOSLOVAKIA: FINISHED STEEL PRODUCTION AND SEMI-FINISHED STEEL FOR SALE, 1935-37
('000 m.t.)

	1929	1935	1936	1937
Semi-finished for sale	395	171	219	306
FINISHED				
Bars, shapes, strip and mine rails	521	295	394	607
Rolled wire	183	87	113	169
Structural steel	117	40	49	71
Rails	77	84	106	146
RR equipment	17	22	22	27
Sleepers	4	7	28	10
Thick and black plates	334	147	194	294
Total finished	1,253	682	906	1,324
Total finished and semi-finished	1,648	853	1,125	1,630

SOURCE: 1929, *Bulletin du Comité des Forges de France, May 1938*, p. 2
1935-37, *Statistisches Jahrbuch für die Eisen- und Stahlindustrie*, 1938 *op. cit.*

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Table VII

CZECHOSLOVAKIA: PRODUCTION, FOREIGN TRADE, AND APPARENT CONSUMPTION OF FINISHED AND SEMI-FINISHED STEEL

('000 m.t.)

	1929	1935	1936	1937
Finished steel				
Production	1,253	682	906	1,324
Imports	a	16	19	25
Exports	607[b]	286	326	452
Available for consumption	...	412	599	897
Semi-finished				
Production for sale	395	171	219	306
Imports	a	c	b	1
Exports	c	3	8	14
Available for Consumption	...	168	211	293

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a. Data not located.
b. Less than 500 tons.
c. Semi-finished exports included with finished.

Production and foreign trade for finished and semi-finished steel are compared in Table VII. There is a possibility that the totals are not strictly comparable in that certain categories may have been included in foreign trade that were not shown in production, but this is not believed to affect

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the overall comparison to any significant degree. The large role which exports played in the Czechoslovak industry is clear from these figures. Steel exports accounted for close to half of domestic production in 1929 and varied between one-third and one-half other years. Exports were largely of finished steel so that the rather sizeable semi-finished-for-sale component of production must have been almost entirely for the home market. Imports were of much smaller relatively importance than exports.

In Tables VIII and IX imports and exports of iron and steel products in 1937 are shown by product and country. The large exports items were iron and steel bars; tubes, pipes and fittings; wire and wire rods; plates; and rails. Imports comprised the same types of products as exports but in much smaller amounts.

Exports went to many countries with none in a position of unusual importance as a customer of the Czechoslovak industry. Other European countries took the bulk of the exports, accounting for at least 70 percent of exports, but fairly important shipments also were made to non-European countries. Imports were mainly from Austria, Germany, and Sweden;

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these countries accounted for about 80 percent of all imports.

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Table VIII

CZECHOSLOVAKIA: EXPORTS OF IRON AND STEEL BY PRODUCT AND COUNTRY OF DESTINATION, 1937
(metric tons)

	Ingots, Blooms etc.	Iron & steel bars	Structural iron and steel	Plates, plain & coated	Wire & Wire rods	Tubes, pipes & fittings	Rails	Other railway material	Other items	Total
Russia	...	994	...	6,641	121	3,935	...	...	739	12,430
Finland	97	7,901	...	5,956	6,060	3,172	...	...	710	23,896
Sweden	515	5,106	...	10,165	10,889	6,942	9	4	1,897	35,527
Norway	...	3,362	...	2,823	4,034	3,028	...	54	1,129	14,430
Denmark	...	899	...	2,887	1,939	1,607	...	...	1,136	8,468
Poland	9	279	...	151	5	170	...	...	483	1,106
Germany	232	2,129	...	4,687	2	81	...	...	1,766	8,897
Netherlands	167	22,349	6	7,871	1,426	14,841	...	87	2,049	48,796
Belgium	6	687	...	10	11	29	...	2	377	1,122
France	10	553	...	62	170	21	...	...	1,570	2,386
Switzerland	4,487	10,625	4	12,402	5,638	4,583	...	40	1,968	39,947
Portugal	...	76	...	60	504	18	...	...	201	859
Spain	...	268	...	...	...	...	...	...	43	311
Italy	1,769	12,098	87	14,642	792	1,446	...	...	2,363	33,197
Austria	278	2,445	...	3,444	78	3,913	...	21	1,651	11,830
Hungary	23	58	...	41	...	108	58	11	29	328
Rumania	1,861	1,982	677	1,596	200	9,941	260	23	3,220	19,760
Bulgaria	...	9,083	95	22	1,080	90	...	24	254	10,648
Yugoslavia	240	2,644	64	3,998	533	1,738	53	319	2,875	12,464
Turkey	...	10	61	...	220	14	...	...	583	888
China	...	1,821	450	879	3,313	2,513	25,303	3,399	403	38,081
Japan	2,983	2,943	...	475	3,956	3,851	...	...	66	14,274
United States	18	153	...	57	...	596	...	...	1,333	2,157
Argentina	...	7,514	18	123	6,775	4,693	...	25	2,149	21,297
United Kingdom	782	902	7	19	10	13,910	...	42	5,183	20,855
India & Ceylon	...	1,131	437	94	361	10,075	...	929	4,114	17,141
Other countries	445	16,843	1,799	2,309	4,929	21,955	3	273	16,781	65,137
TOTAL	13,922	114,855	3,705	81,414	53,046	113,279	25,686	5,253	55,072	466,232

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SOURCE: British Iron and Steel Federation, op. cit., 1938, p. 129

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Table IX

CZECHOSLOVAKIA: IMPORTS OF IRON AND STEEL BY PRODUCT AND COUNTRY OF ORIGIN IN 1937
(metric tons)

	Ingots blooms etc.	Iron & steel bars	Structural iron and steel	Plates, plain & coated	Wire & wire rods	Tubes, pipes & fittings	Rails	Other railway material	Other items	Total
Finland	...	...	...	...	...	...	...	...	1	1
Sweden	2	427	...	294	126	513	...	3	2,664	4,029
Norway	32	20	...	...	...	12	...	...	679	761
Poland	...	16	...	...	71	...	...	...	14	101
Germany	...	1,558	2	2,982	1,290	256	10	5	3,207	9,310
Netherlands	...	1	...	17	3	...	...	...	788	809
Belgium	...	103	...	284	118	...	...	...	136	641
France	21	321	...	115	8	2	...	2	823	1,292
Switzerland	...	...	...	...	...	4	...	...	170	174
Austria	854	6,251	...	1,004	552	114	...	...	8,183	16,958
Hungary	...	...	...	...	9	...	...	4	25	38
Rumania	15	...	...	...	...	...	...	...	1	16
Yugoslavia	...	...	...	70	...	...	...	...	267	337
Japan	...	...	...	...	...	...	...	...	1	1
United States	...	...	...	159	...	...	...	30	1,272	1,461
United Kingdom	10	133	...	182	121	33	...	4	1,493	1,976
Canada	...	...	...	...	...	...	...	...	3	3
Other Countries	...	3	...	57	5	2	...	2	517	586
TOTAL	934	8,833	2	5,164	2,303	936	10	50	20,244	38,476

SOURCE: British Iron and Steel Federation op. cit., 1937, p. 130.

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V. ITALY

A. Introduction

Pre-war Italy made strenuous efforts to build up its domestic steel industry as part of the program of economic independence and military preparedness. Through 1938 steel production did not exceed 2.3 million tons, but this satisfied a large part of domestic requirements before the war. Complete independence in steel was, however, unattainable since Italy had to rely on foreign sources for much of her raw iron and for the fuel to feed her furnaces. The country was lacking in most of the natural fundamentals for a large domestic steel industry.

B. Iron Ore

Italian iron ore production imports and consumption in pre-war years are shown in Table I. Before the war, production had reached the neighborhood of 1 million tons per year. Somewhat more than half of this production was from mines on the Island of Elba. The Nurra producing district in Northern Sardinia and mines in the neighborhood of Aosta, near the Swiss border, each produced about 10 percent of the total output and the remaining 25-30 percent of total output was from scattered mines in Tuscany and Lombardy.[a]

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[a] Based on 1939 estimates in The Italian Iron and Steel Industry, prepared by the Reoccupation Division of FEA, November 1943.

[redacted]

Table I

ITALY: IRON ORE PRODUCTION, NET IMPORTS, AND CONSUMPTION

	1929	1935	1936	1937	1938
Production	772	569	858[a]	1,016[a]	997
New Imports	212	187	40	183	386
Available for consumption	984	756	898	1,199	1,383

SOURCE: Bulletin du Comité des Forges; Relazione sul Servizio Minerario e Statistica delle Industrie Estrattive in Italia neil Anno 1937
Statistiches Jahrbuch des Deutsches Reich 1931,
British Iron and Steel Federation, 1937, op. cit. p. 136.
Files of the Foreign Minerals Division of US Bureau of Mines.

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a. Includes manganiferous ore amounting to 19,000 tons in 1936 and 18,000 tons 1937.

Most of the iron ore mined in Italy had a rather high iron-content but total reserves are small. The Elba mines produce ore which averages about 51 percent iron, but also contained a high percentage of silica. The Nurra ores contain about 50 percent iron, and contain a rather large percentage of phosphorous. Proved reserves here have been estimated at 5 million tons. Before the war the Italian government was making efforts to expand production in this area. Aosta ores averaged about 54 percent iron; actual reserves in this area have been estimated at about 8 million tons. Total Italian reserves have been estimated

[redacted]

at 18.5 million tons with an additional 26.5 million tons possible. Actual reserves are estimated to average 57 percent iron content.[1]

In addition to domestic output, the Italian industry relied on imports of ore. Table I indicates net imports of iron ore during the pre-war period: imports varied between 5 and 25 percent of domestic consumption in the years shown. In recent years imports came largely from Morocco (about 75 percent) with Turkey, Algeria, and Spain providing the remaining imports. Net imports were almost the same as gross imports since exports were negligible.

C. Pyrite Ash

An important supplement to the Italian iron-ore supply existed in the ash of domestic pyrites used primarily for the production of sulphur. The pyrite ash was reduced to pig iron in electric furnaces. It has been estimated that about 550,000 tons of pyrite ash averaging 50 percent iron content were produced annually: in 1937 100,000 tons of this total were exported.[2] The pig iron produced from pyrite ash is referred to in Italian statistics as synthetic pig iron and appears in Table V under that heading.

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[1] Wright, op. cit., 3, 15-16.
[2] Wright, op. cit., 16-17.

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D. Scrap

Scrap iron was used quite extensively in the manufacture of steel in Italy. It is evident from a comparison of scrap consumption by steel plants in Table II with pig-iron consumption in Table VI that substantially greater amounts of scrap than of pig iron were used in the production of steel.

Much of the scrap consumed by the Italian industry consisted of imports, which over the period 1935-37 were equal to about 35 percent of Italian scrap consumption. Table II indicates that during this period the US became the chief source of supplies at the expense of continental sources, which were apparently consuming the scrap themselves. Scrap exports were negligible.

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Table II

ITALY: SCRAP CONSUMPTION AND IMPORTS
('000 m.t.)

Consumption	1929	1935	1936	1937	1938
Blast furnaces		50	50	50	
Steel plants		1,763	1,528	1,600	
Iron foundries		165	106	100	
TOTAL		1,978	1,684	1,750	
Imports from					
Continental sources	309	442	295	136	170
North Africa	55	61	13	40	13
United Kingdom	55	6	1	..	7
United States	88	352	277	344	407
Other Countries	111	23	5	24	18
TOTAL	995	990	400	545	615

SOURCE: Hermberg, op. cit.

E. Coal and Coke

Production, foreign trade, and consumption of coal and coke by Italy are shown in Table III. The extreme reliance of Italy on foreign sources of bituminous coal is shown clearly in the statistics. The situation tended to improve over the period shown but even in 1938 domestic production accounted for only about 11 percent of consumption. The situation in coke was somewhat better. In 1929

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domestic production was smaller than imports (although of much greater relative importance than in the case of coal), but by 1938 domestic production far outweighed imports and accounted for about 85 percent of consumption. It must not be overlooked, however, that most of this coke was produced from imported coal. Imported coal and coke normally came largely from England and Germany, with Poland an important source in some years.

The Italian coal and coke position made it desirable for Italy to economize in the use of these fuels so far as possible. Coke was saved by reducing the amount of pig iron needed through the substitution of scrap for pig iron in the steel-manufacturing process. In addition electric furnaces were used rather widely both to reduce ore to pig iron and pig iron to steel.

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Table III

ITALY: BITUMINOUS COAL AND COKE, PRODUCTION, FOREIGN TRADE, AND APPARENT CONSUMPTION

('000 m.t.)

Bituminous coal	1929	1935	1936	1937	1938
Production^{b}	225	443	806	969	1,480
Imports	13,526	13,537	8,720	12,475	11,915
Exports	a	33	7	15	10
Available for consumption	13,751	13,947	9,519	13,429	13,385
Metallurgical coke					
Production	792	998	1,211	1,400	1,739
Imports	1,077	1,053	543	348	218
Exports	...	1	...	2	1
Available for consumption	1,869	2,050	1,754	1,746	1,957

SOURCE: Statistische Übersicht über die Kohlenwirtschaft im Jahre 1937-38
Files of Foreign Minerals Division, US. Bureau of Mines.

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a. Data not located; probably small.
b. Includes small quantities of anthracite.

F. Pig Iron and Ferro Alloys

Italian pig-iron and ferro-alloy production are shown in Table IV. Output increased steadily during these years and by 1939 was 1 million tons. It is altogether likely that output has increased since that time, along

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Table IV

ITALY: PRODUCTION OF PIG IRON AND FERRO-ALLOYS
('000 m.t.)

	1929	1935	1936[a]	1937[a]	1938	1939
Pig iron						
Coke pig iron	542	560	674	684	767	
Synthetic pig iron[b]	129[c]	68			88	
Electric pig iron		5	74	106	9	
Charcoal pig iron	...	1[d]	...	...	...	
	641	633	747	790	864	951
Ferro-alloys						
Ferromanganese		23	15	21	20	12
Ferrosilicon		14	16	19	12	13
Spiegeleisen	16	24	18	18	21	13
Other alloys		9	12	16	13	11
	55	70	59	74	66	49
TOTAL	696	703	806	864	930	1,000

SOURCE: 1929, British Iron and Steel Federation, op. cit.
1935-37, Statistische Jahrbuch für die Eisen - und Stahlindustrie
1938-39, Bureau of Mines, Minerals Yearbook 1924; Gazzetta Ufficiale del Regno d'Italia. Bollettino Mensile di Statistica dell'Istituto Centrale di Statistica

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[a] Date reproduced as shown in the source. Possibly the figures 74 and 106 include synthetic pig iron which is in the table shown to be included with coke pig iron.

[b] Apparently this is pig iron made from pyrites in electric furnaces.

[c] Includes anthracite-coke pig-iron which is included under coke pig-iron in other years.

[d] Under 500 tons.

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with an increase in pig-iron capacity. It is noteworthy that pig-iron production was well below the level of steel output, a reflection of the extensive use of scrap.

Italian pig-iron production was concentrated in a relatively few centers, the most important of which were the cities of Porto Ferraio, Bagnoli, Aosta, Piombino, Servola, and Sesto San Giovanni.[1] Porto Ferraio, the most important pre-war producer, smelted ore produced in the Elba mines close by. Ore from the Elba mines also was sent to other pig-iron-producing centers, particularly Piombino and Bagnoli. Aosta relied on ores produced in the Val d'Aosta mines near Cogne. It is probable that during the war plants have been constructed at Cornigliano near Genoa to smelt Nurra ores.

Table VI brings together the figures on Italian production, foreign trade, and apparent consumption of pig iron and ferro-alloys. On balance Italy was a net importer of pig iron. 1929 imports were about 22 percent of consumption; in more recent years net imports did not exceed 10 percent of consumption. In ferro-alloys, foreign trade was practically non-existent.

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1. Italian Iron and Steel Industry, p. 5.

[redacted]

Table V

ITALY: PRODUCTION AND CONSUMPTION OF PIG IRON AND FERRO-ALLOYS

('000 m.t.)

	1929	1935	1936	1937	1938
Pig Iron					
Production	641	633	747	790	864
Imports	178	78	27	22	70
Exports	a	12	11	4	b
Consumption	819	699	763	808	997
Ferro-alloys					
Production	na	70	59	74	66
Imports	na	1	1	2	1
Exports	na	3	1	b	b
Consumption	na	68	59	76	67

SOURCE: 1929, Confederazione Fascista degli Industriali, L'Industria dell'Italia Fascista, Rome, 1939, p. 229.
1935-37, Statistisches Jahrbuch für die Eisen-und Stahl-industrie, 1938, pp. 116-120
1938, Files of the Foreign Minerals Division, US. Bureau of Mines

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a. Not located.
b. Under 500 tons.

G. Steel

The production of steel ingots and castings in Italy is shown in Table VI. In 1938 output had reached a peak of 2.3 million tons, and it is likely that production increased in succeeding years, along with an expansion of

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steel capacity. The data indicate that open-hearth steel was the most important variety, with electric steel accounting for most of the remainder. During the period considered, electric-steel output grew considerably while open-hearth output declined somewhat.

Table VI

ITALY: PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESS
('000 m.t.)

	1929	1935	1936	1937	1938
Ingots					
Open hearth	1,859	1,649	1,425	1,493	1,684.
Bessemer	...	4	8	10	11
Crucible	...	a	a	a	a
Electric	211	557	591	584	628
Castings	53	a	a	a	a
TOTAL	2,123	2,209	2,024	2,087	2,323

SOURCE: 1929-36, British Iron and Steel Federation, 1937, p. 136.
1937-38, *Gazzetta Ufficiale del Regno d'Italia. Bollettino Mensile di Statistica dell'Istituto Centrale di Statistica*, August 1939, p. 674.

---

a. Less than 500 tons.

The production of steel was apparently less concentrated geographically than the production of pig iron. The regional distribution in 1938 in percentage

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terms was as follows:[1]

Lombardy	35.8 percent
Piedmont	20.1
Liguria	17.3
Tuscany	12.1
Campania	8.0
Umbria	6.2

Thus, over 50 percent of production was in the Po Plain, especially in Milan and Turin and less than 10 percent south of Rome. Extentions to capacity were planned at Bagnoli and Piombino in Campania and Tuscany respectively. New steel plants were planned for Servola and Cornigliano in Elba and Liguria respectively. As a result, the comparative importance of the several regions may have changed.

The statistics of Italian production and foreign trade in finished steel products are shown in Tables VII - X. Data on production, as shown in Table VII, indicate that an omnibus class including bars, rails, and structural shapes constituted the most important product group. All other classes of output, as shown, were of rather large relative importance.

Italian imports of iron and steel are shown in Table VIII. The largest class of imports was rods and bars, followed by the several types of plates and sheets. Together they accounted for practically all imports. Imports

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[1] The Italian Iron and Steel Industry, p. 13. The percentages are as shown in the source and do not add up to 100.0.

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Table VII

ITALY: PRODUCTION OF IRON AND STEEL PRODUCTS
('000 m.t.)

	1929	1935	1936	1937	1938
Bars, rails, and structural shapes	1,284	1,183	947	1,016	970
Rods	165	186	114	165	170
Plates - thick and medium	413	153	182	144	205
Plates - fine		171	152	179	180
Tin plates		98	78	89	82
Seamless tubes		115	117	115	127
TOTAL	1,862	1,907	1,616	1,708	1,735

SOURCE: L'Industria dell'Italia, Fascista, op. cit. p.229 ff.

are shown according to country of origin in Table IX. Although the totals do not agree with those in Table VIII it is believed that the relative importance of different countries is as shown in Table IX. Over the period shown Germany, Austria, Belgium-Luxemburg, France, and Czechoslovakia were the chief sources of imports.

Exports were of considerably smaller importance than imports. These are shown by product group in Table X. This table may not contain a complete statement of exports, but it is believed fairly well to represent those products which are included in Tables VII and VIII.

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Table VIII

ITALY: IMPORTS OF IRON AND STEEL PRODUCTS
('000 m.t.)

	1929	1935	1936	1937	1938
Iron castings	8	2	2	2	1
Steel castings	6	1	2	2	2
Bars and rods	94	145	65	108	113
Hoop and strip	3	2	1	2	2
Wire	2	1	1	1	1
Rails	1	a	a	a	1
Tubes, pipes and fittings	..	..	..	..	..
Wrought and cast	19	11	11	12	6
Plates and sheets	32	35	20	43	34
Plates, galvanized, coated, etc.	14	6	9	9	15
Tinplates	44	16	4	20	10
Wire rope	1	a	1	1	1
TOTAL	224	219	116	200	106

SOURCE: British Iron and Steel Federation, 1937. op. cit. p. 36.
. 1935 - Bulletino Mensile di Statistica, August 1939, p. 674 ff.

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a. Less than 500 tons.

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Table IX

ITALY: IMPORTS OF IRON AND STEEL PRODUCTS BY COUNTRY
('000 m.t.)

	1929	1935	1936	1937
Germany	33	32	36	40
Austria	7	20	47	50
Belgium-Luxemburg	29	65	6	13
France	52	105	12	35
United Kingdom	32	3	a	4
Czechoslovakia	25	10	3	28
United States	5	3	..	9
Other	14	12	4	..
TOTAL	197	250	108	179

SOURCE: 1929-36, Banca d'Italia, l'Economia Italiane Tome, 1935 Vol. II, pp. 1181-2.
1937, Statistisches Jahrbuch für die Eisen- und Stahlindustrie 1938, p. 117.

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a. Less than 500 tons.

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Table X

ITALY: EXPORT OF IRON AND STEEL PRODUCTS
('000 m. t.)

	1935	1936	1937
Railroad material	9	6	7
Girders and "U"s	5	3	2
Bars	15	25	22
Hoop iron	a	a	a
Plates and sheets	41	17	36
Wire	1	1	3
Cables	1	1	1
Pipes and tubes	11	11	10
Iron and steel castings	2	1	2
TOTAL	85	65	83

SOURCE: 1935-37, Statistisches Jahrbuch für die Eisen- und Stahlindustrie, 1938, p. 118-9.

---

a. Less than 500 tons.

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VI. POLAND

A. Introduction

Poland was a fairly large steel producer during the pre-war period. In terms of volume of production she fell somewhere between the class represented by Luxemburg, Czechoslovakia, and Italy -- all medium-sized producing nations -- and the group of relatively small steel-producers such as Hungary and Austria. During the war some expansion of capacity may have occurred as a result of the German policy of working the Upper Silesian district to the utmost, but the changes are not believed to be significant.

The Polish industry was almost completely concentrated near the German border in Polish Upper Silesia and the province of Kielce. Polish resources of iron ore and coal are also found in these regions.

B. Iron Ore

Polish production, foreign trade, and consumption of iron ore are shown in Table I. It is noteworthy that in all years imports of ore were of the same general order of magnitude as production. This was true even in periods when Polish iron-ore consumption was far below the production level attainable in the country (as determined by peak-year output). This indicates that Polish steel-producers preferred to mix domestic ores with ores imported into the country, which can be attributed to the fact that Polish

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Table I

POLAND: PRODUCTION, FOREIGN TRADE, AND APPARENT CONSUMPTION OF IRON ORE
('000 m.t.)

	1929	1935	1936	1937	1938
Production	659	332	467	780	873[c]
Imports	511[a]	304	413	651	b
Exports	...	22	18	26	b
Available for consumption	1,170	614	864	1,406	...

SOURCE: Wright, *op. cit.*, 38; *Statistisches Jahrbuch für die Eisen-und Stahlindustrie*; Bureau of Mines, *Minerals Yearbook*, 1940.

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a. Net imports.
b. Not located.
c. May include production in former Czechoslovakian districts.

---

ores are not of a particularly high grade, while higher-grade ores could be purchased elsewhere.

By far the largest iron-ore-producing district was Czestochowa-Wielun; annual production was in the neighborhood of 401,000 tons of ore containing 30 percent iron. Other production was from the Kielce-Radom area, where up to 100,000 tons of ore containing about 28 percent iron were mined annually; and East Upper Silesia whose ores con-

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tain 40-45 percent iron. Total Polish reserves have been estimated at 60 million tons of proved ore and an additional 200 million tons of possible ore. The average grade is about 33 percent iron.

Iron ore imported into Poland came from several sources. Sweden was normally the most important supplier: in 1937 Swedish shipments were close to 200,000 tons of ore containing between 50 and 60 percent iron. Other important suppliers were Greece, Sierra Leone, and Norway.

C. Scrap Iron

Scrap consumed in the Polish iron and steel industry is indicated in Table II below.

Table II

POLAND: SCRAP CONSUMPTION AND IMPORTS
('000 m.t.)

	1935	1936	1937
Consumption			
Blast furnaces	64	85	101
Steel plants	669	740	964
Iron foundries	23	35	42
Total	756	860	1,107
Net imports[a]	360	450	640

SOURCE: Hermberg, op. cit.; Statistisches Jahrbuch für die Eisen-und Stahlindustrie

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[a] Net imports almost equal total imports since exports are negligible.

[redacted]

The widespread utilization of open-hearth steelmaking facilities permitted wide substitution of scrap for pig iron. Comparison of Table II and Table IV suggests that a greater weight of scrap than of pig iron was charged into steel furnaces. Roughly, 50 percent of the rather large amounts of scrap consumed in the Polish iron and steel industry was imported. Scrap imports apparently came from many sources.

D. Coal and Coke

Poland produced more than enough coal to meet her needs, and was able to export both coal and coke. Coal production was concentrated in the neighborhood of East Upper Silesia and determined the location of the bulk of steel plants there. Statistics of production, foreign trade, and domestic consumption of bituminous coal and metallurgical coke are shown in Table III.

E. Pig Iron

Polish production of pig iron according to quality and district is shown in Table IV. By 1938 production reached a peak level of close to 1 million tons, but this figure may possibly include the production of former Czechoslovakian districts. There seems little doubt, however, that production in those regions which were part of Poland in 1937 had increased their output substantially during 1938. The statistics show East Upper Silesia as the

[redacted]

Table III

POLAND: PRODUCTION, FOREIGN TRADE AND APPARENT CONSUMPTION OF COAL AND COKE
('000 m.t.)

	1929	1935	1936	1937	1938
Coal					
Production	46,147	28,540	29,741	36,209	38,087
Imports	60	94	88	87	102
Exports	13,912	8,906	8,362	11,003	11,669
Available for consumption	32,295	19,728	21,467	25,986	26,520
Coke					
Production	1,858	1,387	1,616	2,126	2,290
Imports	233	61	66	82	67
Exports	150	306	357	308	277
Available for Consumption	1,941	1,142	1,325	1,900	2,080

SOURCE: Statistische Übersicht über die Kohlenwirtschaft im Jahre 1937-38

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Table IV

POLAND: PIG IRON AND FERRO-ALLOY PRODUCTION BY QUALITY AND DISTRICT
('000 m.t.)

Quality	1929	1935	1936	1937	1938
Foundry	148	41	81	93	...
Direct castings	1	a	a	a	...
Basic	2	25	36	51	...
Open hearth and Bessemer	514	302	438	531	...
Pig iron for puddling	...	...	...	...	...
Special pig iron (alloys)	39	26	28	49	...
TOTAL	704	394	584	724	968[b]
District					
East Upper Silesia	...	300	412	505	...
Rest of Poland	...	94	172	219	...

SOURCE: Statistisches Jahrbuch für die Eisen-und Stahl-Industrie, 1938; British Iron and Steel Federation, op. cit.; Bureau of Mines, Mineral Yearbook, 1942.

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a. Less than 500 tons.
b. May include some production from former Czechoslovakian districts.

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most important producing district. Actually almost all of the production of the rest of Poland is in the immediate neighborhood of East Upper Silesia, the whole forming a single producing region located between the cities of Czestochowa and Katowice.

Polish pig-iron production may be considered practically identical with consumption, for foreign trade in pig iron was of negligible importance. This can be seen from Table V.

Table V

POLAND: PRODUCTION, FOREIGN TRADE AND CONSUMPTION OF PIG IRON AND FERRO-ALLOYS
('000 m.t.)

	1935	1936	1937
Production	394	584	724
Imports	3	5	11
Exports	9	9	14
Available for Consumption	388	580	721

SOURCE: Statistisches Jahrbuch für die Eisen-und Stahl-Industrie, p. 152-3.

F. Steel

Steel production in Poland is shown in Table VI. It is apparent that peak production was somewhere around 1.5 million tons. Production was principally by the open-hearth process, and from the same districts in which coal

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Table VI

POLAND: PRODUCTION OF STEEL INGOTS AND CASTINGS BY QUALITY AND DISTRICT

('000 m.t.)

Quality	1929	1935	1936	1937	1938
Open hearth	1,328	916	1,105	1,401	...
Electric steel	18	20	25	37	...
Castings	30	9	10	14	...
TOTAL	1,376	945	1,140	1,452	1,549
District					
East Upper Silesia	...	606	755	908	...
Rest of Poland	...	339	385	544	...
TOTAL		945	1,141	1,452	

SOURCE: Statistisches Jahrbuch für die Eisen-und Stahl-Industrie, 1938; British Iron and Steel Federation, op. cit.

and iron mining and pig-iron production were concentrated.

The production of finished steel in Poland is shown in Table VII. The two leading classes of output were steel merchant bars and sections and plates and sheets; together they accounted for about 50 percent of finished steel output. Foreign trade in iron and steel products is

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shown in Table VIII. Poland was a net exporter of a fairly substantial proportion of her home production. Apparently total net exports should not be considered directly comparable with finished-steel production, since different classes of products are included, but comparison of individual classes of output, such as "bars, sections, shapes, etc.", "plates and sheets" and "rails," suggests that in these categories the export trade accounted for a large percentage of domestic output. Most exports went to Germany.

[redacted]

Table VII

POLAND: PRODUCTION OF FINISHED STEEL
('000 m.t.)

	1929	1935	1936	1937
Rails	130	80	74	114
Sleepers and fishplates	29	19	20	27
Girders	82	60	86	99
Steel merchant bars and sections	347	209	261	308
Universal iron	17	16	14	19
Hoop and strip	38	41	44	48
Wire rods	74	88	108	135
Plates and sheets	213	114	166	200
Tool steel and special steels	26	21	13	125
Other items	7	25	40	
TOTAL	962	674	826	1,076

SOURCE: British Iron and Steel Federation, op. cit., p. 143, 1937
Statistisches Jahrbuch für die Eisen-und Stahl-industrie, 1938, p. 151.

[redacted]

Table VIII

POLAND: EXPORTS AND IMPORTS OF IRON AND STEEL
('000 m.t.)

	Imports		Exports	
	1935	1936	1935	1936
Puddled iron	23	23	...	...
Rails	a	a	49	27
Bars, sections, shapes, etc.	4	5	99	122
Plates, sheets, tinplates, and galvanized sheets	2	3	31	50
Wire and wire rods	1	a	14	10
Tubes, cast and wrought	1	1	37	37
Other railway material	a	a	7	3
Hoop and strip	1	a	13	18
TOTAL	32	32	250	267

SOURCE: British Iron and Steel Federation, *op. cit.*, p. 143

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a. Under 500 tons.

[redacted]

VII. SWEDEN

A. Introduction

Sweden was one of the world's outstanding producers of high-grade iron ore. Most of the ore produced in the country was exported. The relatively small quantities which were retained were for the production of high-grade pig iron and steel, and in large measure, these, too, eventually found their way into exports. The abundance of iron-ore resources was counterbalanced by the lack of coal and coke. Coal had to be imported; charcoal and electricity (available in relative abundance) were also used as fuel.

B. Iron Ore

Swedish iron-ore production is shown in Table I. Output reached a peak of about 15 million tons in 1937, with 10.8 million from Lapland. Ore produced here contains 60-65 percent iron and a relatively high phosphorous content, and was brought into use through the development of the basic method of steel making.

Central Sweden produced about 2.6 million tons in the same year. Two types of ore are produced here: a high-phosphorous ore averaging 60 percent iron and low-phosphorous ore averaging about 50 percent iron. The latter grade of ore is normally retained for domestic output of

[redacted]

Table I

SWEDEN: IRON ORE PRODUCTION
('000 m.t.)

Province	1929	1935	1936	1937	1938
Norbotten (Lapland)	...	4,889	7,467	10,775	9,532
Kopparberg (Central Sweden)	...	1,991	2,455	2,617	2,686
Other	...	1,053	1,327	1,560	1,711
TOTAL	11,468	7,933	11,249	14,952	13,929

SOURCE: 1929 - British Iron and Steel Federation, p. 148.
1936-38 - *Bulletin du Comité des Forges de France*, December 1939
1935 - *Statistisches Jahrbuch der Eisen-und Stahl-Industrie*, 1938, p. 164.

high-grade iron and steel. It is ideal for this purpose because of the absence of phosphorous.

Sweden has extensive iron-ore reserves. Total reserves have been estimated at more than 2 billion tons of ore averaging better than 60 percent iron content. These estimates are said to be on the conservative side so that actual reserves may be considerably larger. The bulk of the reserves are in the north in Lappland.[1]

By far the largest part of Swedish ore was exported. This is evident from a comparison of export totals

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[1] Wright, *op. cit.*, 3. U.S. Tariff Commission, *op. cit.*, 167.

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in Table II with production in Table I. No more than about 1 million tons were retained for domestic use in any year. Exports consisted mainly of Lappland ore, but there was some shipment of Central Sweden's low-phosphorous ore. Exported ore went mainly to Germany. The United Kingdom and Czechoslovakia also imported sizable amounts but they were far smaller than the amounts taken by Germany.

Table II

SWEDEN: IRON ORE EXPORTS
('000 m.t.)

	1929	1935	1936	1937	1938	1939
Germany	7,955	5,561	8,131	9,459	8,945	10,915
United Kingdom	1,075	1,049	1,467	2,213	1,650	1,448
Czechoslovakia	748	314	419	762	798	140
Other	1,121	796	1,181	1,530	1,292	1,147
TOTAL	10,899	7,720	11,198	13,964	12,685	13,650

SOURCE: 1929-1935, - Tariff Commission, op. cit. p. 163
1936-1938 - Wright, op. cit. p. 55
1938-1939 - Bureau of Mines. Files of the Foreign Minerals Division.

C. Scrap

Sweden is reported to use smaller quantitites of scrap in steel production than other countries producing open-hearth and electric steel. This has been explained by the difficulty of securing the quality scrap required in

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the production of the high-grade steel in which she specializes. Scrap was imported but it was probably used in large part for the production of cheaper tonnage steels. Imports and exports of scrap are shown in Table III.

Table III

SWEDEN: IMPORTS AND EXPORTS OF SCRAP
('000 m. t.)

	1929	1935	1936	1937	1938	1939
Imports	27	71	106	97	25	167
Exports	10	7	15	11	18	6

SOURCE: 1929 - Tariff Commission, op. cit. p. 171.
1935-37 - Statistisches Jahrbuch für die Eisen-und Stahlindustrie 1938, p. 166-167
1938-39 - Bureau of Mines, Foreign Minerals Division Files

D. Coal and Coke

It is evident from Table IV that Sweden was almost completely dependent on foreign sources of coal and coke. However, the dependence of her iron and steel industry on foreign fuel supplies was not so great as these figures would suggest, since charcoal and electricity were used to some extent in the production of steel and pig iron. Coal and coke imports are shown by country in Table V. England and Poland supplied the bulk of Sweden's coal. Throughout the period

Table IV

SWEDEN: PRODUCTION, FOREIGN TRADE AND APPARENT CONSUMPTION OF COAL AND COKE

('000 m.t.)

	1929	1935	1936	1937	1938	1939
	Bituminous Coal					
Production	395	424	456	460	450	444
Imports	4,994	5,254	5,616	6,606	5,769	5,182
Consumption	5,489	5,678	6,072	7,046	6,219	5,626
	Metallurgical Coke					
Production	104	114	115	122	112	115
Imports	1,265	1,747	2,078	2,331	1,940	2,339
Consumption	1,369	1,861	2,193	2,453	2,052	2,454

SOURCE: Statistische Übersicht über die Kohlenwirtschaft im Jahre 1937, p. 108
Minerals Yearbook 1942, pp. 41, 78

shown Germany was the chief coke supplier, but others, notably England, Poland, Belgium and Holland, were of importance in certain of the years.

[redacted]

Table V

SWEDEN: COAL AND COKE IMPORTS BY COUNTRY
('000 m.t.)

	1929		1935		1936		1937		1938	
	Coal	Coke	Coal	Coke	Coal	Coke	Coal	Coke	Coal	Coke
Germany	942	660	408	766	533	866	636	886	660	577
England	2,363	569	2,498	205	2,695	139	3,368	174	2,675	198
Poland	1,664	...	2,307	134	2,333	213	2,549	270	2,420	154
Belgium	a	a	4	173	4	262	6	324	9	322
Holland	2	13	9	450	29	588	4	533	2	539
Other	23	...	28	19	22	10	33	144	3	150
	4,994	1,265	5,254	1,747	5,616	2,078	6,596	2,331	5,769	1,940

SOURCE: Statistische Übersicht über die Kohlenwirtschaft im Jahre 1937-38, p. 109

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a. Included with "other".

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E. Pig Iron

Pig-iron production according to quality is shown in Table VI. Peak production was apparently around 800,000 tons annually. One interesting aspect of the quality distribution is the relatively large importance of acid pig iron (made from low-phosphorous ore and used in the production of high-grade steel) and also the relatively large importance of foundry and forge pig iron used directly in the manufacture of iron products.

Table VI

SWEDEN: PIG IRON PRODUCTION BY QUALITY
('000 m.t.)

	1929	1935	1936	1937	1938	1939	1940
Foundry	73	94	85	92	...	...	...
Acid	137	186	205	189	...	...	...
Basic	227	250	261	327	...	...	...
Forge	42	30	28	29	...	...	...
Direct castings	11	9	10	11	...	...	...
TOTAL	490	570	588	648	714	691	787

SOURCE: British Iron and Steel Federation, *op. cit.* p. 143.
Minerals Yearbook, 1942, p. 35.

The production of pig iron was concentrated in central Sweden, but there were also some furnaces in

[redacted]

southern Sweden. For the most part production was by charcoal blast furnaces, as indicated in Table VII. The remainder was largely accounted for by coke blast furnaces with a sizable amount also produced in electric furnaces.

Table VII

SWEDEN: PIG IRON PRODUCTION BY TYPE OF FURNACE, 1937
('000 m.t.)

Type of furnace	No. furnaces in operation	Output
Blast (coke)	11	270
Blast (charcoal)	39	318
Electric	10	60
TOTAL	60	648

SOURCE: Wright, op. cit., 54

Production, foreign trade and consumption of pig iron are summarized in Table VIII. Sweden tended, on balance, to be a net importer of pig iron, but both imports and exports were relatively large. The phenomenon of simultaneous large-scale imports and exports is explained by the fact that Sweden exported high-grade pig iron, in which she specialized, and imported ordinary grades for the production of tonnage-grade steel products.

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Table VIII

SWEDEN: PIG IRON PRODUCTION, TRADE, CONSUMPTION
('000 m.t.)

	1929	1935	1936	1937	1938	1939
Production	490	570	588	648	714	691
Imports	90	100	167	190	76	197
Exports	71	65	78	90	94	118
Available for Consumption	509	605	677	748	696	770

SOURCE: British Iron and Steel Federation, op. cit., p. 148-151.
US. Bureau of Mines, Foreign Minerals Division Files.

F. Steel

The production of steel ingots and castings is shown in Table IX. Production reached a peak of about 1 million tons in 1937; this was a level of output about ½ again as large as in 1929. Open-hearth steel was the most important quality produced, but both Bessemer and electric steel were of large relative importance. It is noteworthy, too, that acid steel was an important component of the open-hearth and Bessemer totals. The large relative importance of acid steel stems from the availability of low-phosphorous iron ore. Steel production was concentrated in central Sweden, but there was also some production in southern Sweden.

[redacted]

Table IX

SWEDEN: STEEL INGOT AND CASTINGS PRODUCTION BY PROCESS
('000 m.t.)

Process	1929	1935	1936	1937
Bessemer				
Acid	13	21	16	16
Basic	70	88	94	93
Open-hearth				
Acid	238	202	230	272
Basic	259	399	431	470
Crucible	1	a	a	a
Electric	113	186	206	254
TOTAL	694	896	977	1,106

SOURCE: British Iron and Steel Federation, op. cit. p. 140.

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a. Less than 500 tons.

The production of finished iron and steel products and of semi-finished products for sale is shown in Table X. Semi-finished iron and steel was the largest single item of production, accounting for about ½ of the overall total. The most important finished products were bar iron and steel; hoop, nail, strip and other fine sections of steel; wire rods; tubes; plates; and structural steel.

[redacted]

Swedish imports and exports of iron and steel products are shown in Tables XI and XII respectively. In quantity terms, imports were larger than exports, but the value of exports was usually greater than that of imports because higher-grade varieties of steel were included. Imports consisted mainly of rolled bars and shapes and plates and sheets and were equal to a very high percentage of domestic production of finished iron and steel products. The nature of the exports is unclear from the statistics but they are generally known to include special products such as high-grade steel strips for making razor blades; bar steel for tools; high-grade steel wire; and tubes for antifriction bearings.[1]

The geographic distribution of Swedish exports is shown in Table XIII. These figures apparently include pig iron and therefore are higher than those in Table XII. Exports covered the world but European countries constituted the chief market. Among individual nations, Germany, France, the United Kingdom, and the United States were the outstanding customers.

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[1] U. S. Tariff Commission, op. cit., 176

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Table X

SWEDEN: PRODUCTION OF SEMI-FINISHED AND FINISHED STEEL
('000 m.t.)

	1929	1935	1936
Semi-finished for sale			
Billets, blooms, etc.	448	583	640
Other semi-finished iron	26		
Finished	475	694	719
Hammered and forged iron and steel	35	36	39
Hot rolled iron and steel	..	..	..
Tube blanks: hollow	..	29	20
Tube blanks: Solid	16	35	27
Bar iron and steel, round, square, flat	133	152	159
Angles, girders, and other sections	20	47	42
Rails	16	17	18
Fishplates and keel plates	2	1	7
Axles	1	2	2
Hoop, nail, strip and other fine sections of steel	93	100	106
Wire rods	78	99	115
Tubes, hot rolled and hot drawn (also hot pressed)	..	70	69
Plates, over 3 mm. thick	24	35	39
Plates, under 3 mm. thick	54	71	76
Total finished and semi-finished	949	1,277	1,359

SOURCE: British Iron and Steel Federation, op. cit. p. 149.

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Table XI

SWEDEN: IMPORTS OF IRON AND STEEL PRODUCTS
('000 m.t.)

	1929	1935	1936	1937
Rolled bars and shapes	173	205	245	340
Rails	13	12	12	11
Tinplates	11	16	16	20
Other plates and sheets	79	73	111	136
Cast-iron pipes	21	31	34	45
Wrought-iron pipes	27	10	18	19
TOTAL	324	347	436	571

SOURCE: British Iron and Steel Federation, op. cit. p. 150.

Table XII

SWEDEN: EXPORTS OF IRON AND STEEL PRODUCTS
('000 m.t.)

	1929	1935	1936	1937
Blooms and rough bars	17	14	13	14
Rolled and hammered iron and steel	158	158	174	211
TOTAL (incl. other items)	246	242	263	306

SOURCE: British Iron and Steel Federation, op cit. p. 150.

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Table XIII

SWEDEN: EXPORTS OF IRON AND IRON GOODS BY COUNTRY
('000 m.t.)

	1935	1936	1937
Germany	58	51	50
France	22	22	25
United Kingdom and Ireland	71	91	108
Other Europe	100	110	123
Africa	6	9	10
Asia	21	22	29
United States	30	38	42
Other North America and Central and South America	7	8	11
Australia	1	2	2
Other	1	2	12
TOTAL [a]	319	355	412

SOURCE: Statistisches Jahrbuch für die Eisen-und Stahlindustrie, 1938, p. 168

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[a] Totals may not check due to rounding.

[redacted]

VIII. SPAIN

A. Introduction

Spain was more important as a producer and exporter of high-grade ore than as a steel-producing country. The probable position of Spanish industry in the post-war period can not be determined from the statistical record of the middle 1930's since this period was marked by a succession of internal crises culminating in Civil War. Particular attention in this discussion is therefore directed to operations of the industry in 1929.

B. Iron Ore

Spanish iron-ore production is shown in Table I. Output in 1929 was more than 6 million tons: this was a much higher level of production than was attained during the 1930's, but represented a substantial decline from the pre-World War I peak of 10 million tons in 1913.

Ore was produced in a great number of districts, but the largest production was from the Northern province of Viscaya. Viscaya together with the adjacent province of Santander accounted for more than onephalf of the 1929 production. A secondary concentration of production was in Southern Spain in the provinces of Granada, Almeria, Murcia, and Huelva. Substantial amounts were also produced in Northeast Spain, particularly in the Teruel province.

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Table I

SPAIN: PRODUCTION OF IRON ORE
('000 m.t.)

	1929	1935	1936	1937	1938
Viscaya	2,603	1,599	1,397	749	1,820
Santander	770	419	433	202	327
Granada	462	501	230	8	8
Almeria	818	41	75	38	29
Huelva	392	89	48	232	134
Teruel	649				
Murcia	224	165	85	41	228
Other	629				
TOTAL	6,547	2,814	2,268	1,270	2,546

SOURCE: 1929, *Estadistica Minera de Espana*, 1929, p. 66
1935-38, *Estadistica Minera y Metalurgica de Espana*, 1935-38.

For the most part the Spanish ores average better than 50 percent iron content, as shipped, and are low in phosphorus. Total Spanish reserves have been estimated at 711 million tons of proved ore and an additional 273 million tons of possible ore, averaging 51 percent iron.[1]

A very large part of Spanish iron-ore production was exported. In 1928, 5.6 million tons out of a total production of 6.1 million tons were shipped to other

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[1] Wright, op. cit. p. 373.

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countries. As Table II indicates, the United Kingdom was the largest customer. Germany and the Netherlands were also large customers and together with the United Kingdom they accounted for almost all Spanish exports.

Table II

SPAIN: IRON ORE EXPORTS BY COUNTRY
('000 m.t.)

	1929	1935
United Kingdom	2,547	1,085
Germany	774	228
Netherlands	1,828	499
Belgium	48	31
France	353	34
United States	34	5
Argentina	..	1
Other	11	11
TOTAL	5,595	1,893

SOURCE: British Iron and Steel Federation, op. cit. 1938, p. 146; 1930, p. 109.

C. Scrap Iron

Spain had to rely on foreign sources of scrap iron in order to satisfy domestic requirements. Data on scrap consumption have not been found. Scrap imports were 212,000 tons in 1929 and 144,000 tons in 1935.

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D. Coal and Coke

Spanish coal and coke data for 1929 and 1935 are shown in Table III. Spain produced a large part of her requirements of both, but had to rely on foreign sources fully to satisfy her requirements. Coal imports in 1929 were 1.8 million tons and practically all of this came from England. Coke imports, too, were mainly from England, but Germany was also an important supplier of coke.

Table III

SPAIN: PRODUCTION, FOREIGN TRADE AND APPARENT CONSUMPTION OF COAL AND COKE
('000 m.t.)

Bituminous Coal	1929	1935
Production	7,108[a]	7,017[a]
Imports	1,767	1,074
Exports	...	...
Available for Consumption	8,875	8,091
Metallurgical Coke		
Production	984	500
Imports	207	80
Exports	...	...
Available for Consumption	1,191	580

SOURCE: Statistische Übersicht über die Kohlenwirtschaft im Jahr 193[illegible]-38.

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a. Includes anthracite.

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E. Pig Iron

Pig-iron production and imports are shown in Table IV. Production in 1929 was around 750,000 tons and this was supplemented with imports of about 20,000 tons. Production was concentrated in the Northern provinces of Viscaya, Oviedo, and Santander, with scattered production elsewhere.

Table IV

SPAIN: PRODUCTION AND IMPORTS OF PIG IRON
('000 m.t.)

	1929	1935
Production	753	355
Imports	19	1

SOURCE: British Iron and Steel Federation, op. cit., 147.

F. Steel

The geographic distribution of steel production was much the same as for pig iron. Production in 1929 was about 1 million tons. As shown in Table V, this consisted of 623,000 tons of open-hearth steel, 362,000 tons of Bessemer and 19,000 tons of electric. As with most other European countries open-hearth steel was quantitatively the most important, but the relative importance of Bessemer was greater in Spain than in any producing country outside of

[redacted]

Table V

SPAIN: PRODUCTION OF STEEL INGOTS AND CASTINGS

	1929	1935	1936	1937	1938
Open hearth	623	...	...	...	...
Bessemer	362	...	...	...	...
Electric	19	...	...	...	...
TOTAL	1,004	580	287	100	471

SOURCE: Imperial Institute, *The Mineral Industry of the British Empire and Foreign Countries, Statistical Summary*, 1931; Hermberg, *op. cit.*

[redacted]

France, Belgium-Luxemburg, and Germany.

The statistical record of finished steel production is incomplete   Table VI   shows production for 1935, the only relatively recent year for which it has been possible to locate reasonably complete data. Structural steel and bars were the most important product groups in that year.

Table VI

SPAIN: PRODUCTION OF FINISHED IRON AND STEEL, 1935
('000 m.t.)

Beams and U's	85
Iron bars	163
Plates, 3 mm thick and over	31
Thin plates	28
Rolled wire	28
Rails and rail fastenings	24
	358

SOURCE: *Statistisches Jahrbuch für die Eisen- und Stahl-Industrie*, 1937, p. 168

So far as can be determined from scattered statistics, exports of iron and steel products from Spain were so small as to be negligible. Statistics on imports are shown in Table VII. The total volume of imports in 1929 was about 75,000 tons: this was probably in the order

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of 10 percent of home production. The chief product groups among imports were steel bars and special steels and plates and sheets.

Table VII

SPAIN: IMPORTS OF STEEL PRODUCTS
('000 m.t.)

	1929	1935
Ingots and puddled bars	6	a
Steel bars, etc., and special steel	24	3
Rails and railway material	9	1
Hoop and strip	1	1
Plates, sheets, and tinplates	27	4
Wire and wire rods	2	1
Tubes, pipes, and fittings	6	2
TOTAL	75	11

SOURCE: British Iron and Steel Federation, op. *cit* p. 147.

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a. Under 500 tons.

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IX. AUSTRIA

A. Introduction

Before the war Austria was among the smaller steel-producing countries of Europe. Her annual output of ingots and castings did not exceed about 650,000 tons. The steel industry was based on rather extensive iron-ore reserves located within the country, particularly at the Erzberg mine in Styria. Steel production was handicapped, however, by the lack of coal of coking quality.

Extensive changes are understood to have occurred in the Austrian industry under the impact of Anschluss with Germany and the war. Linz was chosen as the site of a huge iron and steel development which was to be based mainly on Erzberg ores. When completed this works was to produce about 1 million tons of pig iron and possibly a somewhat larger amount of steel. Latest indications are that several blast furnaces may have been erected and that some are in operation. In addition, extensive coke-producing facilities appear to have been completed. It is doubtful that any substantial progress has been made in the program for constructing steel facilities to match the blast-furnace and coke-oven capacity and it is possible that the idea may have been abandoned. Possibly some electric furnaces have

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been completed. For the most part the pig iron and coke seem to be shipped for use elsewhere.

B. Iron Ore

Production, foreign trade, and apparent consumption of iron ore in Austria are shown in Table I. By 1938 the production of ore exceeded 2.5 million tons. Austrian mines are able far to exceed the 1938 production rate; indications are that during the war annual output may have reached more than twice the 1938 level. This is due chiefly to the relative ease with which production may be expanded at the open-cut Erzberg mine.

In pre-war years practically all of Austrian iron-ore production came from the Erzberg. Erzberg ore contains from 33 to 38 percent iron as mined and can be concentrated to 45 percent iron. It is comparable to high-grade Swedish ore because of its low sulphur and phosphorous content. The only other important source of iron ore was the Hüttenberg mine in Corinthia. Total Austrian reserves have been estimated at 119 million tons of proved ore and an additional 23 million tons of "possible" ore.[1]

It is evident from Table I that Austria exported rather substantial percentages of the amounts produced.

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[1] Wright, *op. cit.*, 3.

During the years 1935-37 exports averaged about 20 percent of production: as shown in Table II these went mainly to Germany and Czechoslovakia.

Table I

AUSTRIA: PRODUCTION, FOREIGN TRADE AND APPARENT CONSUMPTION OF IRON ORE
('000 m.t.)

	1929	1935	1936	1937	1938
Production	1,891	775	1,024	1,885	2,647
Imports	a	1	3	8	a
Exports	a	131	213	383	a
Available for consumption		645	814	1,710	

SOURCE: *Statistisches Jahrbuch für die Eisen-und Stahl-Industrie*, 1938
British Iron and Steel Federation, *op. cit.*
Bulletin du Comité de Forges de France, March 1939.

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a. Data not located.

Table II

AUSTRIA: IRON ORE EXPORTS BY COUNTRY
('000 m.t.)

	1935	1936	1937
Germany	..	33	236
Czechoslovakia	85	113	113
Other countries	46	67	34
TOTAL	131	213	383

SOURCE: *Statistisches Jahrbuch für die Eisen-und Stahl-Industrie*, 1938, p. 45.

[redacted]

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C. Scrap Iron

Austrian scrap consumption and foreign trade are shown in Table III. Imports came mainly from Belgium-Luxemburg.

Table III

AUSTRIA: CONSUMPTION OF SCRAP ACCORDING TO USES AND NET IMPORTS
('000 m.t.)

	1935	1936	1937
Blast furnaces	2	1	4
Steel plants	203	219	313
TOTAL	205	220	317
Net imports	26	5	56

SOURCE: Hermberg, *op. cit.*

D. Coal and Coke

Table IV shows the salient statistics on the Austrian coal and coke position. Domestic production of coal was quite small and an amount almost equal to total consumption had to be imported. Metallurgical coke was not produced domestically and the total consumption had to be imported. This coke situation has undoubtedly changed because of the wartime development at Linz, where large coke-oven batteries have been erected. Before this Germany was the chief source of coke, while coal was imported principally

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from Poland, Germany, and Czechoslovakia.

Table IV

AUSTRIA: PRODUCTION, FOREIGN TRADE AND APPARENT CONSUMPTION OF COAL AND COKE
('000 m.t.)

	1929	1935	1936	1937
	Bituminous Coal			
Production	208	260	244	230
Imports	5,302	2,469	2,361	2,649
Exports	...	...	...	...
Available for consumption	5,510	2,729	2,605	2,879
	Metallurgical Coke			
Production	...	...	...	...
Imports	748	369	396	551
Exports	...	...	...	.1.
Available for consumption	748	369	396	551

SOURCE: Statistische Übersicht über die Kohlenwirtschaft im Jahre 1937-38.

E. Pig Iron and Ferro-Alloys

Austrian production and foreign trade in pig iron are shown in Table V. The 1929 production peak of close to ½ million tons was not bettered through 1937. Output has increased substantially since 1937 and the 1929 peak has

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Table V

AUSTRIA: PRODUCTION, FOREIGN TRADE,[a] AND APPARENT CONSUMPTION OF PIG IRON
('000 m.t.)

	1929	1935	1936	1937
Production	459	193	248	389
Imports	b	28	29	34
Exports	b	12	23	57
Available for consumption		209	254	363

SOURCE: British Iron and Steel Federation, *op. cit.* *Statistisches Jahrbuch für die Eisen-und Stahl-Industrie*, 1936. p. 45.

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a. Trade includes ferro-alloys: probably production does too.
b. Data not located.

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probably been exceeded by a considerable amount. The increase in production has probably been accompanied by increased shipments of pig iron outside Austria since steel production has not expanded to anything like the same degree. In the post-war period, therefore, Austria's ability to export pig iron will probably be greater than the data in Table V indicate.

F. Steel

The production of steel ingots and castings in Austria is shown in Table VI. Production up until 1937 did not exceed 650 thousand tons: it is likely that output has grown since that time along with an increase in steel capacity. Of the 650,000 tons produced in 1937, close to 20 percent was quality steel; a large portion of this steel was exported after being rolled in Austrian mills. As the table indicates, the ordinary-grade steel was entirely the product of open hearth furnaces, as was much of the quality product. The center of production before the war was the Donawitz-Leoben area in the province of Styria.

Table VI

AUSTRIA: PRODUCTION OF STEEL INGOTS AND CASTINGS
('000 m.t.)

	1929	1935	1936	1937
Open hearth[a]	...	300	339	540
Quality steel[a]	...	64	79	110
TOTAL	644	364	418	650

SOURCE: 1929, British Iron and Steel Federation, op. cit., p. 125.
1935-37, Statistisches Jahrbuch für die Eisen-und Stahlindustrie 1938, p. 44

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a. The statistics are shown as found in the source cited. Actually the so-called "quality steel" was probably largely the product of open hearth furnaces. The distinction is between grades of steel and not production method used.

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Finished-iron-and-steel production is shown in Table VII. The entire output was accounted for by relatively few items; chief among these are iron and steel bars, plates, wire, structural iron and steel, and rails. Production may be compared with exports, shown in Table VIII. Exports equalled from 40 to 45 percent of production in 1936 and 1937. This may overstate their importance somewhat, since exports appear to include product groups not shown under production. For individual products, where no such difficulty in comparison arises, it is apparent that rather large percentages of the output of bars, plates and sheets, and wire were for export. Exports in 1937 went mainly to Italy, Japan, Switzerland, Czechoslovakia, Rumania, Germany, and Yugoslavia. Total imports were of much smaller relative importance, running at about 25,000 tons in 1936 and 1937.

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Table VII

AUSTRIA: FINISHED IRON AND STEEL PRODUCTS
('000 m.t.)

	1935	1936	1937
Iron bars	68	70	112
Steel bars	51	58	88
Beams, U's	12	13	24
Other construction iron	6	6	12
Rails	19	22	31
Thick plate	29	26	42
Thin plate	30	36	44
Rolled wire	29	31	48
Forged pieces and pressed parts	4	6	7
Other rolled goods	17	19	26
TOTAL	265	288	434

SOURCE: Statistisches Jahrbuch für die Eisen-und Stahl-Industrie, p. 144.

[redacted]

Table VIII

AUSTRIA: EXPORTS OF IRON AND STEEL PRODUCTS
('000 m.t.)

	1935	1936	1937
Blooms, ingots, etc.	16	34	64
Iron and steel bars and strip	28	31	68
Plates and sheets	11	14	26
Wire	8	7	11
Wire rope	1	a	a
Tubes, cast and wrought	1	1	2
Rails	2	2	5
Railway material	..	2	2
Other items	b	14	23
TOTAL	b	105	201

SOURCE: 1935 - Statistisches Jahrbuch für die Eisen-und Stahlindustrie, 1938, pp. 46, 47.
1936-37 - British Iron and Steel Federation; op.cit.

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a. Under 500 tons.

b. Data not located, therefore no total is shown.

[redacted]

X. HUNGARY

A. Introduction

Hungary's pre-war iron and steel industry was about the same size as the Austrian industry. Not enough iron ore was produced domestically to support a steel industry of this size, nor were fuel resources ample for the purpose. Hence, both iron ore and metallurgical coke had to be imported. In good part exports of finished steel products paid for imports of essential raw materials. All stages of production -- from iron ore to steel -- were concentrated in the Miskolc area.

B. Iron Ore

Production, foreign trade, and apparent consumption of iron ore by Hungary are shown in Table I. Output

Table I

HUNGARY: PRODUCTION, FOREIGN TRADE AND APPARENT CONSUMPTION OF IRON ORE
('000 m.t.)

	1929	1935	1936	1937	1938[a]	1939[a]
Production	252	192	289	290	370	370
Imports	553	267	396	499	419	442
Exports	45	20	49	64	6	9
Consumption	760	439	636	725	783	803

SOURCE: *Statistisches Jahrbuch für die Eisen-und Stahl-Industrie*, 1938
Wright, *op. cit.*
Imperial Institute, *op. cit.*, 1931.

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[a] May include former Czechoslovak districts.

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in 1938 and 1939 reached a peak of 370 thousand tons but this may include production in newly acquired Czechoslovakian districts. Production in prior years did not exceed about 300,000 tons of ore and came largely from the Miskolc district in Northeastern Hungary. The iron content of the ore mined averaged about 39 percent. Hungary's reserves of iron ore are small; it has been estimated that there are about 20 million tons of developed ore and an additional 4 million tons of possible ore with an average iron content of 39 percent.[1] Hungary imported larger quantities of ore than she produced domestically. Imports were largely from Yugoslavia.

C. Scrap Iron

To judge from the generally higher level of steel production than of pig-iron production, substantial quantities of scrap iron must have been used in steel production in Hungary. Not enough scrap was generated within Hungary to satisfy the demand and hence scrap was imported in the following amounts (in thousand metric tons):[2]

1935	1936	1937	1938	1939
54	50	64	65	124

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[1] Wright, *op. cit.*, 3.
[2] Hermberg, *op. cit.*; Files of the Foreign Minerals Division, U. S. Bureau of Mines.

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D. Coal and Coke

Hungary's coal and coke position is summarized in Table II. Coal had to be imported and there was a complete reliance on foreign coke. Coke imports from Germany and Czechoslovakia accounted for the total in recent years. The tendency over the period was for Germany to grow at the expense of Czechoslovakia and at the same time completely to eliminate Poland which was an important supplier in 1929. A similar generalization holds true for coal with the added factor that the drop in imports since 1929 was accompanied by the complete elimination of Poland as a supplier.

[redacted]

Table II

HUNGARY: PRODUCTION, FOREIGN TRADE, AND APPARENT CONSUMPTION OF COAL AND COKE

('000 m.t.)

	1929	1935	1936	1937	1938
Bituminous coal					
Production	826	823	827	917	1,042
Imports	1,276	189	191	208	195
Exports	112	20	19	34	34
Available for Consumption	1,990	992	999	1,091	1,203
Metallurgical coke					
Production[a]	...	...	...	...	...
Imports	561	177	273	371	328
Exports[a]	2	10	8	9	8
Available for Consumption	559	167	265	362	320

SOURCE: Statistische Übersicht über die Kohlenwirtschaft im Jahre 1937-8, p. 95-6.
Minerals Yearbook, 1942, p. 78.

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[a] There may be slight coke production in Hungary. Exports show up in the statistics, but apparently represent cross-hauling only.

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D. Pig Iron and Ferro-Alloys

Production, imports, and consumption of pig iron and ferro-alloys are shown in Table III. Imports varied in importance; they were rather sizable in 1935-36 and fell off in 1937-39. In 1939 the production of pig iron reached a peak of 460,000 tons, but this may include some small production in former Czechoslovak areas. Production of pig iron within Hungary was concentrated in the Miskolc area, as in the case of mining.

Table III

HUNGARY: PRODUCTION AND IMPORTS OF PIG IRON AND FERRO-ALLOYS
('000 m.t.)

	1935	1936	1937	1938	1939
Production	196	306	358	351	460
Imports	66	92	15	11	9
Consumption[a]	262	398	373	362	469

SOURCE: Statistisches Jahrbuch für die Eisen-und Stahl-industrie 1938, p. 180
Minerals Yearbook, 1942, 35.

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a. Apparently there were some exports but they were of negligible importance.

E. Steel

Steel production by process is shown in Table IV.

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Table IV

HUNGARY: STEEL PRODUCTION BY PROCESS
('000 m.t.)

	1929	1935	1936	1937
Open hearth	496	414	512	625
Electric furnace	18	32	41	40
TOTAL	514	446	552	665

SOURCE: 1929, Imperial Institute, Statistics of the Mineral Industry
1938, Statistisches Jahrbuch für die Eisen-und Stahlindustrie, p. 180.

Total output reached a peak of 665,000 tons in 1937: this was composed entirely of open-hearth and electric steel -- with open-hearth predominant. Production was concentrated in the vicinity of Miskolc, particularly in the city of Ozd.

Data on the production of finished steel in Hungary have not been assembled. Foreign trade is shown in Table V and VI. It can be seen that imports were negligible, while exports added up to a substantial total. Semi-finished steel was a particularly large export item along with iron and steel bars; plates and sheets; and tubes, pipes and fittings. In 1937 exports went chiefly to Rumania, Yugoslavia, Sweden and Italy.

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Table V

HUNGARY: IRON AND STEEL IMPORTS AND EXPORTS
('000 m.t.)

	Imports				Exports			
	1929	1935	1936	1937	1929	1935	1936	1937
Blooms, billets, ingots, etc.	1	a	a	a	63	63	43	28
Iron and steel bars	1	a	a	a	20	16	20	33
T's, U's, sections, etc.	2	a	a	a	13	8	3	5
Hoop and strip	a	a	a	a	..	a	a	1
Tool and special steel	1	1	1	2	..	..	..	..
Wire and wire rods	2	1	1	1	2	1	1	1
Plates and sheets	4	1	1	1	17	21	31	41
Tubes, pipes, fittings	3	a	a	1	1	13	20	28
Rails	a	a	a	a	7	2	5	1
Other railroad material	2	a	3	a	4	13	8	8
Other items	a	2	2	3	b	5	6	8
TOTAL	16	5	8	8	127^b	144	139	153

SOURCE: Statistisches Jahrbuch für die Eisen-und Stahlindustrie, 1938, p. 180

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a. Less than 500 tons.
b. Data not located; total is therefore incomplete.

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Table VI

HUNGARY: IRON AND STEEL EXPORTS BY COUNTRY, 1937
('000 m.t.)

	Italy	Rumania	Yugoslavia	Sweden	Bulgaria	Austria	Other	Total
Blooms, billets, ingots, etc.	..	21	7	..	..	..	a	28
Iron and steel bars	4	a	7	7	1	..	13	33
T's, U's, sections, etc.	..	a	4	..	a	..	1	5
Hoop and strip	..	a	a	..	a	..	..	1
Wire and wire rod	a	a	a	..	..	..	1	1
Plates and sheets	5	1	4	10	..	..	21	41
Tubes, pipes, and fittings	..	13	a	a	..	..	14	28
Rails	..	..	1	..	..	..	..	1
Other railroad material	..	a	3	..	2	..	2	8
Other items	a	a	a	a	a	..	5	6
TOTAL	10	35	27	17	4	a	58	151

SOURCE: British Iron and Steel Federation, *op. cit.*, p. 133.

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a. Less than 500 tons.

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XI. RUMANIA

A. Introduction

Rumania's iron and steel production expanded considerably in the pre-war decade. The industry is, however, small in comparison with that of other steel-producing countries. Production is limited by the country's poor raw-material situation: neither iron ore nor coking coal seem available in sufficient amounts to support a large steel industry. Steel production was in the hands of just 2 or 3 companies, with the Resita S.A. occupying a dominant position because of its monopoly hold on the only available resources of coking coal.

B. Iron Ore

The salient statistics on Rumania's iron ore position are shown in Table I. Pre-war production did not exceed 140,000 tons per year of ore ranging from 36 to 48 percent iron content. This was not enough to satisfy domestic requirements. As a result important amounts were imported, largely from Yugoslavia.

Over one-half of domestic production came from the neighborhood of Hunedoara and another 30 percent came from the Telivc mines: both these districts are in western Rumania not far from the town of Resita. The remaining output came mainly from mines in the vicinity of Ocna-de-Fer near Carpatho-Ukraine. Rumania's iron-ore reserves have been estimated at between 26 and 35 million tons of ore averaging about 40 percent iron.

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Table I

RUMANIA: IRON ORE PRODUCTION, FOREIGN TRADE, AND APPARENT CONSUMPTION

('000 m.t.)

	1929	1935	1936	1937	1938	1939
Production	90	93	109	129	139	132
Imports	a	37^b	88^b	98^b	114	99
Exports	a	..	..	..	41	16
Available for consumption	a	130	197	227	212	215

SOURCE: 1929, Statitisches Jahrbuch für das Deutsche Reich
1935-37, Wright, op. cit., 34
1938-39, Bureau of Mines, Minerals Yearbook, and Foreign Minerals Division Files.

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a. Data not located.

b. Net imports.

C. Scrap Iron

Not enough scrap was generated within the country to feed the steel industry; hence scrap in the following amounts (in '000 metric tons) had to be imported:[1]

1935	1936	1937	1938	1939
23	37	21	74	43

Much scrap iron was consumed in the Rumanian steel industry. In the absence of scrap-consumption figures, this may be deduced from the fact that substantially more steel than pig iron was produced.

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[1] Hemberg, op. cit.; Foreign Minerals Division, U S Bureau of Mines.

D. Coal and Coke

Data relating to Rumania's coal and coke position are found in Table II. According to all accounts the lack of fuel was a factor limiting the output of iron and steel. Both bituminous coal and coke had to be brought into the country. In the case of coke, amounts equal to between 30 and 40 percent of domestic consumption were imported. It is possible that the country's coke capacity has increased during the war: there have been reports that coke is now being produced in the town of Petrosani (where construction of a steel plant had been contemplated) in addition to the coke produced at Resita (previously the sole producer). Coke imports before the war were mainly from Czechoslovakia, Germany, and Poland.[a] In addition to coke, charcoal was used as a blast furnace fuel.

E. Pig Iron and Ferro-Alloys

Table III contains data on the production and consumption of pig iron and ferro-alloys in the Rumanian iron and steel industry. The production of pig iron reached a peak of about 140,000 tons in 1938-39. This production was apparently accounted for by no more than three plants: Resita S.A. at Resita with somewhere around 100,000 tons,

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[a] Le Commerce Exterieur de la Rumania, Part I., Bucuresti, 1939

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Table II

RUMANIA: PRODUCTION, FOREIGN TRADE AND APPARENT CONSUMPTION OF COAL AND COKE
('000 m.t.)

	1929	1935	1936	1937	1938	1939
		Bituminous Coal				
Production	371	278	293	300	299	285
Imports	a	21	23	28	27	14
Exports	..	..	..	..	..	..
Available for consumption	a	299	316	328	326	299
		Metallurgical Coke				
Production[b]	73	66	78	78	86	
Imports	a	38	39	49	63	
Exports	..	..	..	..	..	
Available for consumption	a	104	117	127	149	

SOURCE: *Statistische Übersicht über die Kohlenwirtschaft im Jahre 1937-38*, p. 99.
Bureau of Mines, *Minerals Yearbook, 1942*, p. 78.

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a. Data not located.

b. Includes gashouse coke.

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Titan-Nadrag-Calan S.A. at Ferdinand with 20,000 tons and a State-owned works at Hunedoara with 20,000 tons. There were, in addition, some imports of pig iron, but the quantities involved were small.

Table III

RUMANIA: PRODUCTION AND IMPORTS OF PIG IRON
AND FERRO-ALLOYS
('000 m.t.)

Production	1929	1935	1936	1937	1938	1939
Basic pig iron	...	60	65	...	...	...
Foundry pig iron	...	22	30	...	...	...
Spiegeleisen	...	b	1	...	...	...
TOTAL	72	82	97	126	133	140
Imports	a	7	6	9	10	7
Total Production and Imports	..	89	103	135	143	147

SOURCE: Statistisches Jahrbuch für das Deutsche Reich 1933; Statistisches Jahrbuch für die Eisen-und Stahl-Industrie, 1938; Minerals Yearbook, 1942; Foreign Minerals Division Files.

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a. Data not located.
b. Less than 500 tons.

F. Steel

The production of steel ingots and castings is shown in Table IV. Output reached a peak of 275,000 tons in 1938 and there is a very strong possibility that it has

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increased since then. There have been reports that 1943 production was about 340,000 tons. Production in 1938 was from Resita and Titan-Nadrag-Cálan: the amounts produced were about 200,000 and 75,000 tons respectively. In 1938 two other steel plants were reported to be near completion, at Hunedoara and Bucharest, with a combined capacity of about 150,000 tons. At least one of these, that at Hunedoara, (capacity 100,000 tons) has been reported in operation although it is doubtful that it is producing to capacity. As the table indicates, output was entirely from open-hearth and electric furnaces; the capacity under construction was reported to be open-hearth.

The production of finished iron and steel products in 1935 and 1936 is shown in Table V. Output of finished products ran somewhat larger than the production of steel ingots and castings. This is to be attributed mainly to rather large imports of semi-finished iron and steel for rolling and forging: in 1935 and 1936 such imports totalled 92 and 100 thousand tons respectively. The finished iron and steel produced within the country satisfied domestic requirements for the most part. The only important class of finished imports was tubes, pipes, and fittings (25,000 tons in 1935 and 38,000 tons in 1936): apparently these were not produced within the country. Exports appear to have been insignificant.

[redacted]

Table IV

RUMANIA: PRODUCTION OF STEEL INGOTS AND CASTINGS
('000 m.t.)

	1929	1935	1936	1937	1938
Open hearth	...	181	177	...	...
Electric	...	32	49	...	...
TOTAL	161	213[a]	226[a]	239	275

SOURCE: 1929, Statistical Yearbook of the League of Nations 1937/38; Statistisches Jahrbuch für die Eisen-und Stahlindustrie, 1938; Imperial Institute, The Mineral Industry of the British Empire and Foreign Countries, Statistical Summary, 1935/36, 176.

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a. Of which in 1935, 207,000 tons were ingots and 6,000 tons castings, and in 1936, 220,000 tons were ingots and 6,000 tons castings.

Table V

RUMANIA: PRODUCTION OF FINISHED IRON AND STEEL
('000 m.t.)

	1935	1936
Iron bars and shapes	118	93
Rolled wire	31	56
Hoop iron	10	13
Rails	16	13
Fishplates	6	4
Thick plates	20	23
Thin plates	38	37
Tires	8	6
TOTAL	247	245

SOURCE: Statistisches Jahrbuch für die Eisen-und Stahl-Industrie 1938, p. 156.

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XII. YUGOSLAVIA

A. Introduction

Yugoslavia's steel output was small by comparison with the larger European producers. Output was somewhat below that in Rumania, and, as in the case of Rumania, there was a considerable growth in output during the pre-war decade. The country has a natural endowment of rather high-grade iron ore upon which a domestic industry could draw. More iron ore was produced than could be consumed within the country and ore was exported. Yugoslavia was dependent on outside sources to supplement native sources of scrap iron and coal and to provide all of the coke needed for the manufacture of iron and steel.

B. Iron Ore

Iron-ore production and exports are shown in Table 1. Production rose steadily during the pre-war period and by 1939 reached a peak of 667 thousand tons. Production was largely from two areas: Ljubija, 12 miles south of Prijedor in Bosnia, and Vares 25 miles north of Sarajevo. The deposits at Ljubija produced about 400,000 tons of ore containing 45-50 percent iron; those of Vares produced about 150,000 tons of ore containing 40-60 percent iron. Smaller deposits are also found at Topusco northwest of Ljubija and

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Table I

YUGOSLAVIA: PRODUCTION, EXPORTS, AND APPARENT CONSUMPTION OF IRON ORE
('000 m.t.)

	1929	1935	1936	1937	1938	1939
Production	428	235	451	629	607	667
Net Exports	388	181	314	500	374	385
Available for consumption	40	54	137	129	233	282

SOURCE: Wright, Iron and Steel Industries of Europe, p. 80
League of Nations Yearbook, 1931/32.

scattered through the Northern provinces.[1] Yugoslavia's reserves of proved ore are estimated to be 25 million tons with 40 percent iron content; additional reserves of possible iron ore are estimated at 75 million tons with 40 percent iron content.[2]

The portion of total production retained for domestic use showed a marked rise in the period from 1929 to 1939. Out of a 1929 production of 428,000 tons only 40,000 tons were kept for home consumption; in 1939, 282,000 tons out of an output of 667,000 tons were retained for domestic use. In both years exports ran at about 400,000 tons. The export peak was 500,000 tons in 1937. Exports went largely to Hungary and Rumania.

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[1] Principal Minerals and Metal Resources in Yugoslavia. Reoccupation Division, FEA, November 1943.

[2] Wright, op. cit., 3.

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C. Scrap Iron

Much scrap iron was consumed in the Yugoslavian steel industry. In the absence of scrap-consumption data this may be deduced from the fact that substantially more steel than pig iron was produced. Yugoslavia imported scrap in the following amounts (in thousands of metric tons):[1]

1929	1935	1936	1937
24	33	43	26

D. Coal and Coke

The position of Yugoslavia with regard to bituminous coal and metallurgical coke is shown in Table II. Bituminous coal was produced within the country but not in sufficient amounts to satisfy domestic requirements. The coal was apparently not of coking quality for no coke was produced domestically and Yugoslavian industry was completely dependent on coke imports. Over the years shown imports of coal were largely from Germany, England and Poland, with Germany dominating the field completely beginning in 1936. Coke imports were mainly from Germany, England, and Czechoslovakia.

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[1] Hermberg, op. cit.

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Table II.

YUGOSLAVIA: PRODUCTION, FOREIGN TRADE, AND APPARENT CONSUMPTION OF COAL AND COKE
('000 m.t.)

	1929	1935	1936	1937	1938	1939
Bituminous coal						
Production	409	400	441	428	450	444
Imports	382	220	171	189	234	160
Exports	2	3	2	2	1	...
Available for Consumption	789	617	610	615	683	604
Metallurgical coke						
Production	...	...	...	...	...	...
Imports	246	208	132	222	241	232
Exports	...	...	...	...	...	...
Available for Consumption	246	208	132	222	241	232

SOURCE: 1929-37, Statistische Übersicht über die Kohlenwirtschaft, 1937-38, p. 98.
1938-39, Bureau of Mines, Foreign Minerals Division Files.

E. Pig Iron and Ferro-Alloys

Production and imports of pig iron and ferro-alloys are shown in Table III. Most of the pig iron was apparently produced at Vares, where the largest blast-furnace capacity was located. Small amounts were also produced at Topusko and Beslinac (in the neighborhood of the Ljubija iron-ore district) where small charcoal blast-furnaces operated.

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Pig iron was also imported to supplement domestic production. The amounts involved were not large, but they constituted a rather high percentage of domestic production. They came chiefly from Austria and Czechoslovakia.

Table III

YUGOSLAVIA: PRODUCTION, AND IMPORTS OF PIG IRON AND FERRO-ALLOYS
('000 m.t.)

	1929	1935	1936	1937	1938	1939
Production	31	22	44	41	58	61
Imports	..	5	7	13	17	9
Consumption	31	27	51	54	75	70

SOURCE: League of Nations Statistical Yearbook, 1938/39, p.146; Wright, op. cit., 80.; British Iron and Steel Federation, op. cit.

F. Steel

Production of steel ingots and castings in Yugoslavia in the pre-war years (in thousands of metric tons) was:[1]

1929	1935	1936	1937	1938
98	100	125	169	220

Production of steel was substantially larger than that of pig iron, a fact which points to the widespread substitution of scrap for pig iron in the Yugoslavian steel industry. Practically the entire output of raw steel was produced at

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1. League of Nations, Statistical Yearbook 1938/39, p. 147.

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Zenica (in the neighborhood of the Vares iron-ore mines) and at Jasenica (in the northwestern tip of Yugoslavia near the Austrian and Italian borders). Producing capacity was also scattered elsewhere, particularly at Gustanj-Ravne and Smederevo. Most capacity was open-hearth.

The greatest concentration of rolling-mill capacity was also at Zenica and Jasenica, with scattered facilities located elsewhere. Finished-steel-production figures are not available but capacity and possibly production were somewhat higher than for raw steel.

Domestic production of iron and steel products was not sufficient to satisfy home requirements. As a result Yugoslavia imported rather substantial amounts of iron and steel products. These are shown in Table V. Imports came mainly from Hungary, Czechoslovakia, and Austria.

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Table V

YUGOSLAVIA: IMPORTS OF IRON AND STEEL PRODUCTS
('000 m.t.)

	1935	1936	1937	1939
Semi-finished	9	14	10	9
Iron bars	9	11	10	3
Iron shapes	5	7	8	10
Hoop Iron	1	2	1	2
Raw plates	5	8	8	7
Worked plates	1	3	2	6
Tin plates	4	5	5	6
Wire	2	2	3	3
Tubes	4	8	5	7
Railway material	15	21	13	19
Structural steel	a	2	2	3
TOTAL	55	82	67	75

SOURCE: Statistisches Jahrbuch für die Eisen-und Stahl-industric, p. 171-2
Bureau of Mines, Foreign Minerals Division Files

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a Less than 500 tons.

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XIII. THE NETHERLANDS

A. Introduction

The Netherlands had a very small steel industry with an estimated capacity of about 120,000 tons of ingots and castings. No ironore was produced within the country so that imports provided all of the iron ore consumed. Steel production was not, however, completely dependent on foreign supplies of raw materials, since coal and coke were available. The Netherlands industry was unique chiefly in the fact that it exported relatively large quantities of pig iron.

B. Iron Ore

The total supplies of iron ore available to Netherlands producers were imported. Ore imports according to country are shown in Table I: total imports were in the neighborhood of one-half million tons and came mainly from Sweden, Spain and France.

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Table I

NETHERLANDS: IMPORTS OF IRON ORE
('000 m.t.)

Source	1929	1935	1936	1937	1938	1939
Sweden	101	121	133	176	167	93
Spain	176	113	144	111	52	96
France	106	82	79	109	83	60
Tunisia	a	37	35	73	72	44
Algeria	29	39	65	56	62	71
Norway	27	8	15	31	22	40
Spanish Morocco	19	25	16	24	7	17
Other countries	3	b	1	29	24	42
TOTAL	461	425	489	610	489	484

SOURCE: Tariff Commission, *op. cit.*, *Iron and Steel*, p. 192.
Bureau of Mines, Files of the Foreign Minerals Division.

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a. Included with Algeria.
b. Less than 500 tons.

C. Coal and Coke

The coal and coke position of the Netherlands is summarized in Table II. The country was a small net importer of bituminous coal and an exporter of coke. A good portion of coal imports was apparently for coking purposes. Coal imports were largely from Germany and the United Kingdom: coal exports went mainly to Belgium-Luxemburg and France. Coke was exported chiefly to France, Belgium-Luxemburg, Germany, and, since 1935, Sweden.

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Table II

NETHERLANDS: PRODUCTION, FOREIGN TRADE, AND APPARENT CONSUMPTION OF COAL AND COKE

('000 m.t.)

	1929	1935	1936	1937	1938
Bituminous coal					
Production	11,580	11,878	12,802	14,321	13,488
Imports	9,618	5,061	4,870	5,409	4,915
Exports	6,687[a]	3,168[a]	3,539[a]	4,262[a]	3,660[a]
Available for consumption	14,511	13,771	14,133	15,468	14,743
Metallurgical coke					
Production	2,404	2,878	3,053	3,365	3,200
Imports	371	311	374	427	331
Exports	1,940	2,139	2,305	2,437	2,170
Available for consumption	835	1,050	1,122	1,355	1,361

SOURCE: 1929-38, Statistische Ubersicht uber die Kohlenwirtschaft, 1937-8, p. 79-81.

---

a. Includes bunker coal in 1929 and excludes bunker coal in other years.

D. Scrap Iron

Because it produced only small amounts of steel, and therefore did not require large amounts of scrap iron, the Netherlands was in a position to export scrap. Table III shows imports and exports of scrap by the Netherlands. Scrap exports went mainly to Germany, with the United Kingdom, Poland, and Belgium-Luxemburg also taking substantial amounts in some years.

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Table II

NETHERLANDS: PRODUCTION, FOREIGN TRADE, AND APPARENT CONSUMPTION OF COAL AND COKE

('000 m.t.)

	1929	1935	1936	1937	1938
Bituminous coal					
Production	11,580	11,878	12,802	14,321	13,488
Imports	9,618	5,061	4,870	5,409	4,915
Exports	6,687[a]	3,168[a]	3,539[a]	4,262[a]	3,660[a]
Available for consumption	14,511	13,771	14,133	15,468	14,743
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Table III

NETHERLANDS: SCRAP IMPORTS AND EXPORTS
('000 m.t.)

	1929	1935	1936	1937	1938	1939
Imports	15	13	8	17	23	23
Exports	263	214	300	490	233	209

SOURCE: U. S. Tariff Commission, p. 195, op. cit., 1935-37.
British Iron and Steel Federation, op. cit.

E. Pig Iron and Ferro-Alloys

Table IV shows production, foreign trade, and apparent consumption of pig iron and ferro-alloys. Production reached a peak of 300,000 tons in 1937, but only 76,000 tons were retained for domestic consumption. In all years, a very large percentage of total production was exported. Table V indicates that exports went to many countries, with Belgium-Luxemburg, Sweden, and the United States normally the chief markets.

Table IV

NETHERLANDS: PRODUCTION, TRADE, CONSUMPTION
OF PIG IRON AND FERRO-ALLOYS
('000 m.t.)

	1929	1935	1936	1937	1938	1939
Production	254	256	290	299	267	284
Imports	30	11	14	17	18	19
Exports	179	196	239	240	218	172
Available for consumption	105	71	65	76	67	131

SOURCE: Statistisches Jahrbuch für die Eisen-und Stahlindustrie, 1938.
U.S. Tariff Commission, op. cit., p. 194.
Minerals Yearbook 1942.

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Table V

NETHERLANDS: PIG IRON EXPORTS
('000 m.t.)

	1929	1935	1936	1937	1938	1939
Belgium-Luxemburg	37	45	62	74	34	30
Sweden	9	30	45	41	16	25
U. S.	22	48	63	28	22	16
U. K.	27	a	--	11	25	--
Switzerland	2	9	10	9	4	11
France	31	19	19	8	12	14
Denmark	16	7	4	8	7	9
Germany	14	1	1	4	50	29
Italy	8	11	--	--	8	12
Other countries	13	26	34	56	38	25
TOTAL	179	196	239	240	218	172

SOURCE: Tariff Commission, op. cit., 1938-39 from U. S. Bureau of Mines, Foreign Minerals Division files

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a. Under 500 tons

F. Steel

Data on the production of steel ingots and castings are not available, nor are there statistics on the production of finished steel products. Raw-steel capacity is supposed to be around 120,000 tons. The only information on finished steel products relates to imports and exports; these are shown in Tables VI and VII.

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Imports are of much greater importance than exports. In some years imports exceeded 1 million tons of iron and steel products. They comprise all types of products with the greatest concentration in bars, rods, etc.; structural steel (including girders and section); plates; rails and other railway material; tubes; and wire and wire rods. Exports include the same products as imports but in much smaller amounts. As Table VIII indicates, imports were largely from Germany and Belgium-Luxemburg.

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Table VI

NETHERLANDS: IRON AND STEEL EXPORTS
('000 m.t.)

	1935	1936	1937
Ingots, semi-finished steel, etc.	14	14	1
Bars	2	3	7
Hoop iron	a	a	a
Girders	2	2	8
Structural iron and steel	8	17	22
Plates	3	2	4
Tinplates	a	a	a
Rails and railroad material	2	2)	3
Tyres, wheels, etc.	-	-)	
Tubes (cast and wrought)	8	7	10
Wire and wire rods	a	a	4
Barbed wire	2	3	7
Cables	1	1	1
Anchors and chains	a	a	1
Nails	2	2	5
Bolts, nuts, screws, rivets	3	6	3
TOTAL	46	60	76

SOURCE: British Iron and Steel Federation, op. cit., p. 121.

a Less than 500 tons.

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Table VII

NETHERLANDS: IRON AND STEEL IMPORTS
('000 m.t.)

	1935	1936	1937
Ingots, semi-finished steel, etc.	1	3	1
Bars, rods, etc.	203	186	257
Hoop iron	31	31	44
Girders and sections	109	147	205
Structural iron and steel	11	13	23
Plates	157	226	244
Tinplates	52	61	73
Rails and railroad material	44)	37	64
Tyres and wheels	5)		
Tubes (cast and wrought)	87	78	89
Wire and wire rods	42	47	64
Cables	2	2	4
Anchors and chains	1	1	2
Nails	5	5	4
Bolts, nuts, screws, rivets	6	4	12
TOTAL	756	841	1,084

SOURCE: British Iron and Steel Federation, op. cit., p. 120.

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Table VIII

NETHERLANDS: IRON AND STEEL IMPORTS BY COUNTRY

('000 m.t.)

	1935	1936	1937
Germany	334	391	445
Belgium-Luxemburg	252	268	365
France	40	39	59
United Kingdom	78	69	94
United States	5	19	37
Other countries	57	68	101
TOTAL	767	854	1,101

SOURCE: British Iron and Steel Federation, *op. cit.*, p. 120.

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XIV. NORWAY

A. Introduction

Norway was not significant as a producer of steel but rather as a producer and exporter of rather high-grade iron ores. In addition, Norway produced small quantities of pig iron and ferro-alloys. Most of the ferro-alloys were exported. Only these phases of the industry are handled in the discussion.

B. Iron Ore

Production and exports of iron ore are shown in Table I. Peak production was about 1.8 million tons. This production came almost entirely from three mines: the Sydvaranger mines at Kirkenes whose ore contains 34-35 percent iron and 0.01-0.07 percent phosphorous and is concentrated at the mine to 66 percent iron; the Fosdalen mines at Malm, where the ore has an iron content of 45 percent and is concentrated to 65 percent iron; and the Roudsand mines at Nesset, whose ores contain 30-40 percent iron, 6.7 percent titanium oxide, and 0.45 percent tanadium and are concentrated to 62-63 percent iron, 2 percent titanium oxide, and 0.55 percent vanadium. Total Norwegian ore reserves are extensive: they have been estimated at 367 million tons of proved reserves and an additional 1.5 billion tons of possible ore with an average iron content of 37 percent.[1]

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[1] Wright, op. cit., 3.

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Table I

NORWAY: PRODUCTION AND EXPORTS OF IRON ORE
('000 m.t.)

	1929	1935	1936	1937	1938	1939
Production	746	765	847	1,075	1,275	1,340
Exports	734	786	994	1,026	1,497	1,183

SOURCE: Wright, *op. cit.*, p. 76

As the table shows, production was almost entirely for export: England and Germany took almost the whole of exports. There were no imports.

C. Pig Iron and Ferro-Alloys

Table II shows production and imports of pig iron. Peak production was around 35,000 tons and, in addition, about 25,000 tons were imported in 1936 and 1937. Sources of imports are shown in Table III.

Norway produced considerably larger amounts of ferro-alloys than of pig iron. The ores of the alloy metals were normally imported; particularly ferromanganese and ferrochrome were from imported ores. Table IV shows total production of ferro-alloys and exports of ferromanganese and ferrochrome. Norway's peculiar position as an importer of pig iron and alloy ores and an exporter of ferro-alloys was due to the use of available hydro-electric power in small furnaces. Such furnaces insured the production of a high-grade product.

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Table II

NORWAY: PRODUCTION, IMPORTS, CONSUMPTION OF PIG IRON
('000 m.t.)

	1929	1935	1936	1937
Production	20	32	33	36
Imports	17	15	25	25
Consumption	37	47	58	61

SOURCE: British Iron and Steel Federation, *op. cit.*, p. 140
Wright, *op. cit.*, p. 76.

Table III

NORWAY: PIG IRON IMPORTS BY COUNTRY
('000 m.t.)

	1935	1936	1937	1938	1939
Germany	4	6	3	3	5
United Kingdom	3	1	2	a	..
Netherlands	2	4	7	2	4
USSR	1	7	3	..	1
Sweden	4	4	2	3	3
Other	1	3	7	4	14
TOTAL	15	25	25	12	27

SOURCE: *Statistisches Jahrbuch für die Eisen-und Stahl-industrie*, 1938.

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a. Less than 500 tons.

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Table IV

NORWAY: TOTAL PRODUCTION OF FERRO-ALLOYS AND EXPORTS OF FERROMANGANESE AND FERROCHROME

('000 m.t.)

	1929	1935	1936	1937
Production	134	98	135	145
Exports				
Ferromanganese	--	48	59	67
Ferrochrome	--	12	11	--

SOURCE: Wright, *op. cit.*

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XV. GREECE

A. Introduction

Greece had no iron and steel plant, and was important chiefly as an exporter of iron ore. She relied on imports to satisfy her own iron and steel requirements. Only the production and export of iron ore are considered in this discussion.

B. Iron Ore

Deposits of iron ore are scattered through the Greek mainland and islands. The chief producing districts were at Atalanti in Central Greece, near the Aegean Coast and on the Island of Serifos, one of the Cyclades group in the Aegean. Apparently the two regions were of about equal importance in terms of the quantities produced. The ore mined in both districts contains about 50 percent iron and is low in sulphur and phosphorus. Total Greek iron-ore reserves have been estimated at 100 million tons of proved reserves and an additional 50 million tons of probable ore, with an average iron content of about 50 percent.[1]

Greek exports of iron ore by country of destination are shown in Table I. Germany was the largest customer in all years. The United Kingdom, the Netherlands, and Italy were also relatively large customers in certain years.

---

[1] Wright, *op. cit.*, 3, 91.

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Table I

GREECE: EXPORTS OF IRON ORE BY COUNTRY OF DESTINATION
('000 m.t.)

TO	1929	1935	1936	1937	1938
Germany	...	150	116	145	157
United Kingdom	...	21	...	31	14
Italy	...	12	...	27	1
Netherlands	...	61	26	46	47
Other	...	1	4	89	90[a]
TOTAL	133	245	146	338	309

SOURCE: British Imperial Institute, *op. cit.*
British Iron and Steel Federation, *op. cit.* 1937, p. 132.

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[a] Of which 54,000 tons went to Poland.

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Due to its large size, the following document has been filmed in segments. The order of the segments is as follows: left to right, top to bottom.

PROVISIONAL EDITION

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STEEL MANUFACTURE, IRON ORE AND COAL IN EUROPE

EXCLUDING GREAT BRITAIN AND RUSSIA

IRON MINING DISTRICT
- ● Located by city or town
- ● Located by province or region

STEEL CENTER
- ▲ Located by city or town
- ▲ Located by province

▨ COAL FIELD

COAL FIELDS

1. Malmo
2. Limburg
3. Liege
4. Hainaut
5. Westphalia
6. Aachen
7. Saar
8. Lower Silesia
9. Upper Silesia
10. Nord and Pas de Calais
11. Moselle
12. Loire
13. Bourgogne
14. Gard
15. Tarn Ouvergne
16. Bourbonnais
17. Kladno
18. Pilsen
19. Brünn
20. Moravska Ostrava
21. Petrosani
22. Recita
23. Zenica
24. Senjski Rudnik
25. Dobra Sreca
26. Aleksinac
27. Asturias
28. Cordoba
29. Arsa
30. Carbonia
31. La Tuille
32. Seui

RELIABILITY OF DATA

DATA	QUAN.	QUAL.	LOC.
IRON MINING DISTRICTS			
Located by city or town			A
Located by province or region			NE
STEEL CENTERS			
Located by city or town			A
Located by province or region			NE
COAL FIELDS			NE

Quantitative & Qualitative Data
R - Reliable
GR - Generally Reliable
U - Unreliable
Coverage of Data
C - Complete
I - Incomplete
Location of Data
A - Accurate
NE - Not Entirely Accurate
OA - Only Approx. Accurate

QUANTITATIVE DATA The letters R, GR, and U are an estimate of the reliability of the map's quantitative data, the data which are measurable, including economic or population statistics, hypsometric data, the width of roads, gauges of railroads, etc.

QUALITATIVE DATA The letters R, GR, and U are an estimate of the reliability of the map's qualitative data which shows the types of road surfaces, character of beaches, types of terrain, etc.

COVERAGE The letters C and I in combination with R, GR, or U are an estimate of the degree of completeness of quantitative and qualitative data.

LOCATIONAL DATA The letters A, NE, and OA are estimates of the plotted accuracy of data within the limits of scale and width of line.

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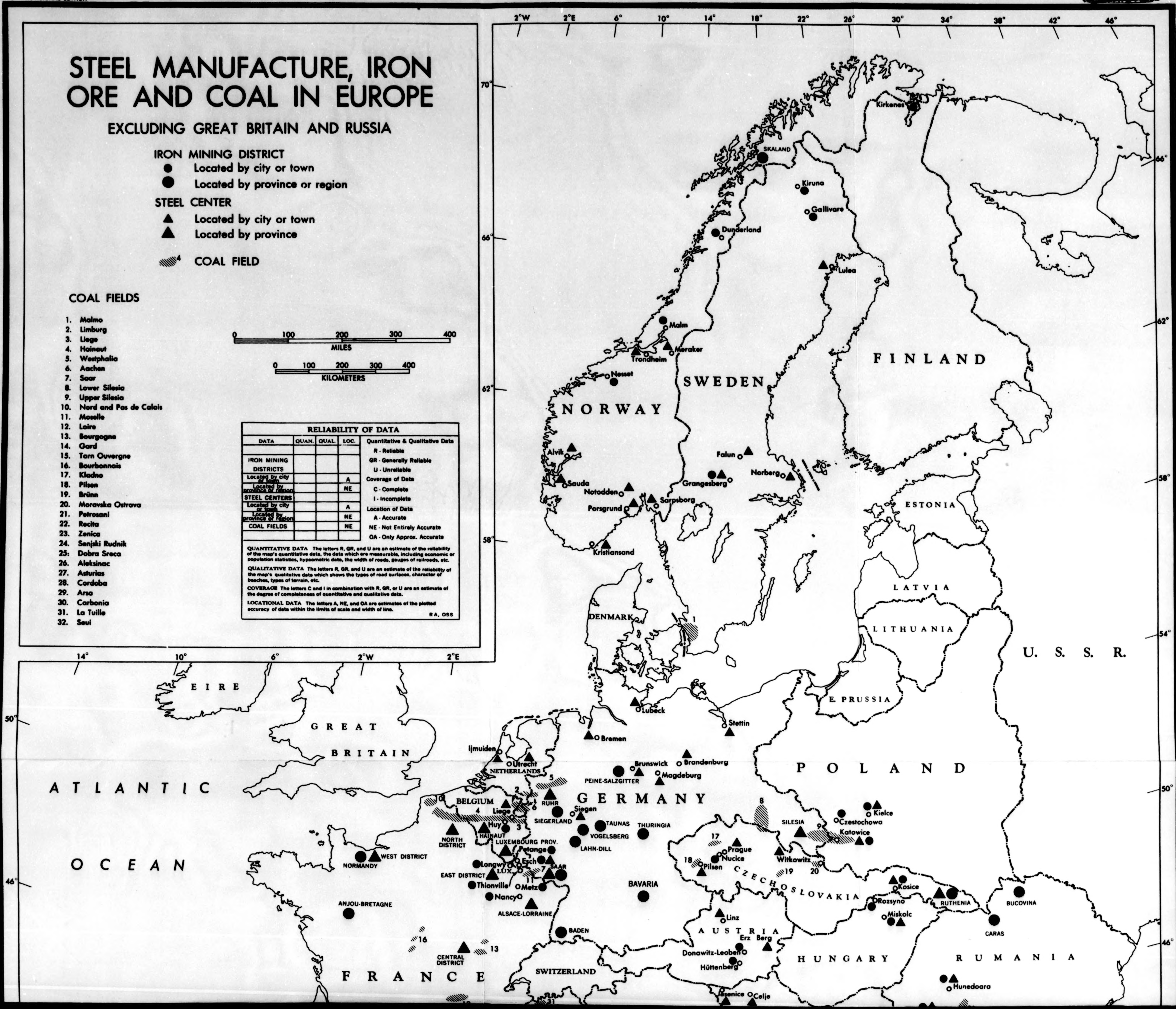
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SKALAND
Kiruna
Gallivare
Dunderland
Lulea
Malm
Meraker
Trondheim
Nesset
FINLAND
SWEDEN
NORWAY
Alvik
Sauda
Falun
Grangesberg
Norberg
Notodden
Porsgrund
Sarpsborg
Kristiansand
ESTONIA
LATVIA
LITHUANIA
DENMARK
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Lubeck
Stettin
Bremen
Ijmuiden
Utrecht
NETHERLANDS
Brunswick
Brandenburg
PEINE-SALZGITTER
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GERMANY
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BELGIUM
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Liege
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RUHR
Siegen
SIEGERLAND
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HAINAUT
NORTH DISTRICT
TAUNAS
VOGELSBERG
LAHN-DILL
THURINGIA
8
SILESIA
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Czestochowa
Kielce
Katowice
NORMANDY
WEST DISTRICT
LUXEMBOURG PROV.
Petange
Esch
Longwy
LUX.
EAST DISTRICT
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SAAR
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Thionville
Metz
Nancy
ALSACE-LORRAINE
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Prague
Nucice
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Pilsen
Witkowitz
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CZECHOSLOVAKIA
BAVARIA
ANJOU-BRETAGNE
Kosice
Rozsyno
RUTHENIA
Miskolc
BUCOVINA
CARAS
Linz
BADEN
AUSTRIA
Erz Berg
Donawitz-Leoben
Hüttenberg
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FRANCE
SWITZERLAND
Jesenice
Celje
Hunedoara
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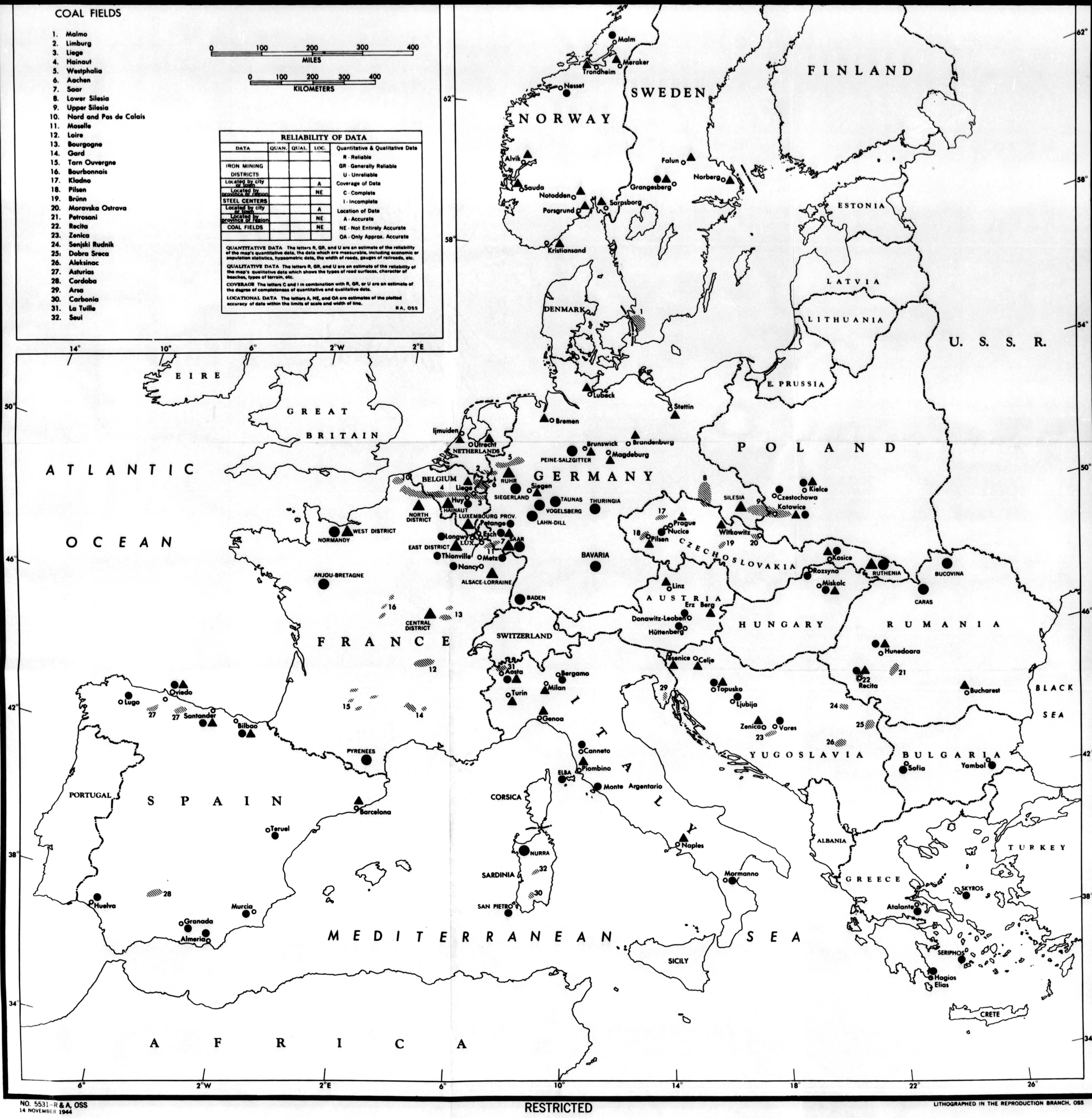
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Alvik
Sauda
Notodden
Porsgrund
Sarpsborg
Kristiansand
Falun
Grangesberg
Norberg
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SIEGERLAND
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VOGELSBERG
THURINGIA
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HAINAUT
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DISTRICT
LUXEMBOURG PROV.
LAHN-DILL
Petange
Esch
Longwy
LUX.
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SAAR
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WEST DISTRICT
NORMANDY
EAST DISTRICT
Thionville
Metz
Nancy
ALSACE-LORRAINE
BAVARIA
BADEN
ANJOU-BRETAGNE
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CENTRAL
DISTRICT
FRANCE
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SWITZERLAND
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Aosta
Bergamo
Milan
Turin
Genoa
SILESIA
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Czestochowa
Kielce
Katowice
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Prague
Nucice
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Pilsen
Witkowitz
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CZECHOSLOVAKIA
Kosice
RUTHENIA
Rozsyno
Miskolc
BUCOVINA
CARAS
Linz
AUSTRIA
Erz Berg
Donawitz-Leoben
Hüttenberg
HUNGARY
RUMANIA
Hunedoara
Jesenice
Celje
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Topusko
Ljubija
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Recita
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Bucharest
BLACK
SEA
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Zenica
Vares
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YUGOSLAVIA
BULGARIA
Sofia
Yambol
Lugo
Oviedo
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Santander
Bilbao
PYRENEES
PORTUGAL
SPAIN
Barcelona
Teruel
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Huelva
Granada
Almeria
Murcia
Canneto
Piombino
ELBA
Monte Argentario
CORSICA
NURRA
SARDINIA
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SAN PIETRO
ITALY
Naples
Mormanno
ALBANIA
TURKEY
GREECE
SKYROS
Atalante
SERIPHOS
Hagios
Elias
CRETE
SICILY
MEDITERRANEAN
SEA
AFRICA

COAL FIELDS

1. Malmo
2. Limburg
3. Liege
4. Hainaut
5. Westphalia
6. Aachen
7. Saar
8. Lower Silesia
9. Upper Silesia
10. Nord and Pas de Calais
11. Moselle
12. Loire
13. Bourgogne
14. Gard
15. Tarn Ouvergne
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